

not differ between the groups. Among individuals without symptoms of depression, males prevailed (90.9% in the non-depressed group vs 69.7% in the group with severe depression, $p=0.007$). Hypercholesterolemia was more frequent in patients with depressive symptoms (43.9% in the non-depressed group vs 63.3% in the group with depressive symptoms, $p=0.02$). During follow-up period 33 patients died (21.2%). Adjusted HR for all-cause mortality on depression score was 1.05, 95% CI 1.01–1.09, $p=0.02$. Patients without depression were accepted as a reference group with HR=1.0 for analysis of categorical indicator. HR was 1.08, 95% CI 0.46–2.54, $p=0.9$ in patients with mild depressive symptoms and 2.92, 95% CI 1.17–7.32, $p=0.02$ in patients with severe depressive symptoms.

Conclusion: Depression was associated with gender and hypercholesterolemia. Severe symptoms of depression are independently associated with all-cause mortality in patients with CHF and implanted cardiac devices for CRT.

P5407
Predicting adherence to internet-delivered cognitive behaviour therapy for comorbid symptoms of depression and anxiety after myocardial infarction

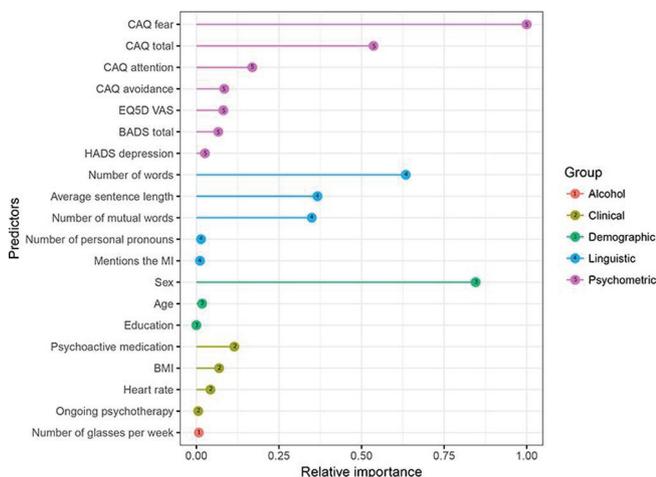
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Background: Psychotherapeutic treatment for the subgroup of patients with MI that also suffer from comorbid symptoms of anxiety and/or depression (MI-ANXDEP) is part of cardiac rehabilitation (CR). Adherence to a range of treatments and lifestyle advice is crucial for risk reduction in these patients. Understanding the relative importance of predictors of adherence to internet-delivered cognitive behaviour therapy (ICBT) for MI-ANXDEP could improve their targeted care.

Purpose: We estimated the relative importance of a range of established and novel predictors of adherence to ICBT for MI-ANXDEP patients.

Method: The study sample consisted of 90 MI-ANXDEP patients (58.4 years, 62% men) recruited from 25 hospitals in Sweden who were randomised to active treatment in the ICBT trial U-CARE Heart. Time-point of prediction was at completion of the first homework assignment (HWA), and adherence was gauged at the end of treatment (48% adherers). Adherence was defined as completing at least the first two HWAs within the 14-week treatment period. A supervised machine learning (ML) procedure, applying 3x10 cross-validated recursive feature elimination with a random forest model as internal classifier, estimated the relative importance of predictors for adherence from a range of patient demographic, clinical, and linguistic variables that were available at completion of the first HWA.

Result: Out of 34 potential predictors, ML selected an optimal set of 19 predictors (Accuracy 0.64, 95% CI 0.61–0.68). The strongest predictors for being classified as adherent were in order of relative importance (1) higher self-rated cardiac fear (CAQ fear), (2) female sex, (3) more words used by the patient to answer the first homework assignment (Number of words), (4) higher self-rated general cardiac anxiety (CAQ total), and (5) a higher rate of words used by the patient that were identical with words prompted by the first homework assignment (Number of mutual words), as depicted in the figure.



Conclusion(s): It is of clinical importance to understand poor adherence to ICBT treatment in the high risk MI-ANXDEP subpopulation. Higher cardiac anxiety and female sex were the strongest predictors for adherence. A novel finding was that

linguistic variables were important for predicting adherence, particularly the number of words used may signify the degree of personal investment and motivation for treatment, and the number of mutual words used may be a proxy for therapeutic alliance within the treatment. Education had no predictive value. Future research should investigate potential causal mechanisms, and whether these findings replicate outside of Sweden, in larger samples, and for similar eHealth treatments.

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P5408
The effects of different preventive counseling programs on illness perception in patients with paroxysmal atrial fibrillation after catheter ablation

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Background: Illness perception is a major contributor to patient's behavior yet little is known about cognitive representation of illness in patients (pts) with atrial fibrillation (AF).

Purpose: To assess the impact of different preventive counseling programs on illness perception in pts after catheter ablation (CA) performed for paroxysmal AF.

Methods: This is a prospective randomized controlled study with 3 parallel groups of pts with paroxysmal AF after CA (radiofrequency or cryoablation). Pts were randomized into 3 groups in 1:1:1 ratio. During hospitalization for CA pts from all groups received single-session preventive counseling with focus on their individual cardiovascular risk factors profile. After discharge pts from Group 1 received remote preventive counseling by phone and pts from Group 2 - by e-mail every two weeks for the first 3 months after enrollment (a total of 6 sessions). Group 3 received usual care. Illness perception was assessed using The Brief Illness Perception Questionnaire (BIPQ). Both overall score which represents the degree to which illness is perceived as threatening or benign and scores for 8 IP dimensions were calculated.

Results: A total of 93 pts aged 37 to 72 years were enrolled (mean age 56.48±7.41 years, 57% men). The groups were well balanced according to demographic and clinical features. At 1 year of follow-up pts from both intervention groups experienced significant improvement of the overall illness perception score vs. control (table). This improvement was mainly driven by significant increase of personal and treatment control and by significant decrease of consequences, concern about their condition and emotional representation to the disease in both groups. The timeline and understanding of the disease did not change significantly.

Conclusions: Preventive counseling programs with remote 3 months support via phone and e-mail improve the illness perception in AF pts after CA what may positively affect their health behavior.

NUTRITION, MALNUTRITION AND HEART DISEASE

P5409
Low-carbohydrate diets and all-cause and cause-specific mortality: a population-based cohort study and pooling prospective studies

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Background: Little is known on the long-term association between low-carbohydrate diets (LCD) and mortality.

Purpose: We aimed to evaluate the link between LCD with total and cause-specific mortality by applying on both individual data and pooling prospective studies.

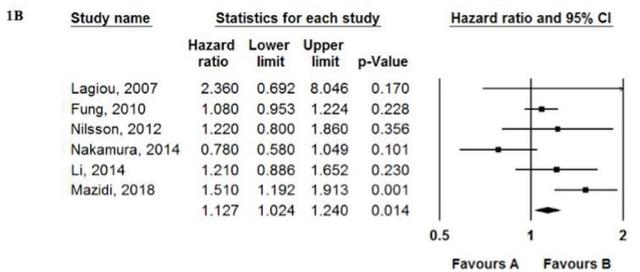
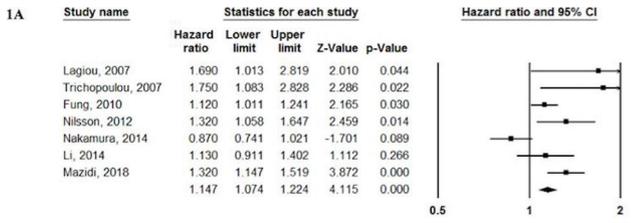
Methods: Data from National Health and Nutrition Examination Survey (NHANES) (1999–2010) were collected. We used adjusted Cox regression to determine the risk ratio (RR) and 95% confidence interval (95% CI), as well as random effects models and generic inverse variance methods to synthesize quantitative and pooling data, followed by a leave-one-out method for sensitivity analysis.

Results: Based on the data from NHANES with 24825 participants (mean age of 47.6 years, comprising 48.6% men and 51.4% women), after adjustment, participants in the top quartile (Q4) of LCD had the highest risk of total (32%; hazard ratio [HR] 1.32 [1.14–2.01], $p<0.001$), cardiovascular (CVD) (50%; 1.50 [1.12–

Abstract P5408 – Table 1

Overall score of illness perception, mean ± SD*	Group 1 (support via phone)	Group 2 (support via e-mail)	Control group	Differences between group 1 vs. control	Differences between group 2 vs. control
Baseline	45.1±12.1	43.73±9.26	45.05±9.87		
After 12 months	29.85±15.3	29.67±7.7	38.75±8.16	$p<0.05$	$p<0.001$

2.31], $p < 0.001$), cerebrovascular (51%; 1.51 [1.19–1.91], $p < 0.001$) and cancer (36%; 1.36 [1.09–1.83], $p < 0.001$) mortality. In the same model, the association between LCD and total mortality was stronger in the non-obese (0.48%) than in the obese (19%) participants. Findings based on the meta-analysis of 7 prospective cohorts with 447,506 participants and 39,326 mortality cases indicated a positive association between LCD and total (RR: 1.15, 95% CI: 1.07–1.22, $p < 0.001$, $I^2 = 8.6$) (figure 1A), CVD (RR: 1.13, 95% CI: 1.02–1.24, $p < 0.001$, $I^2 = 11.2$) (figure 1B) and cancer mortality (RR: 1.07, 95% CI: 1.01–1.14, $p = 0.02$, $I^2 = 10.3$). These findings were robust in sensitivity analyses.



Conclusions: Our study highlighted the unfavorable effect of LCD on total and cause-specific mortality, based on both individual data and by pooling previous cohort studies. Given the fact that LCDs may be unsafe, it would be preferable not to currently recommend these diets. Further studies to clarify the mechanisms involved in these associations and to support our findings are eagerly awaited.

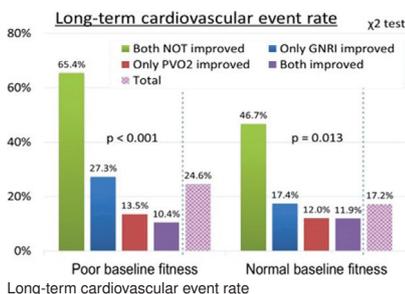
P5410
Improvement of nutritional status contributes to the long-term risk reduction as well as fitness improvement in cardiovascular patients

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Background: Nutritional sufficiency is an essential issue for low-fitness cardiovascular patients, although in what extent nutritional improvement during recovery phase may impact on the future prognosis.

Purpose: To investigate whether the recovery phase nutritional improvement can contribute to the long-term cardiovascular risk reduction as well as fitness improvement.

Methods: We studied 244 consecutive patients (average age 68, range 25–88) who participated in phase II comprehensive cardiac rehabilitation program (CR) at least for 3 months (median 232 days). The program included 1–3 times a week aerobic exercise and resistance training, combined with monthly individual guidance for diet and nutrition. Peak oxygen consumption (PVO2) by cardiopulmonary exercise test was obtained at both the pre- and post-CR periods, and the difference between periods (Δ PVO2) was used as the indicator of fitness improvement. The geriatric nutritional risk index (GNRI) was calculated as following: $14.89 \times$ serum albumin level (g/dl) + $41.7 \times$ body mass index (kg/m^2)/22. The difference of GNRI between pre- and post-CR (Δ GNRI) was used as the indicator of nutritional improvement. Baseline PVO2 < 15.4 ml/kg/min (the median) was defined as “poor baseline fitness”. Cases were divided in 4 groups by the medians of Δ PVO2 and Δ GNRI (1.0 and 6.0, respectively). The Cox proportional hazards regression analysis was used to assess the independent predictors of cardiovascular events. Long-term cardiovascular event rate was compared between groups.



Results: At the observation period (median 648 days), poor baseline fitness cases had significantly higher incidence of cardiovascular event compared with normal cases (24.6% vs. 17.2%, $p = 0.043$). With GNRI improvement, poor baseline fitness cases showed 38% reduction of event rate, whereas 29% reduction in normal cases. Multivariate analysis showed that low- Δ GNRI (hazard ratio (HR) 2.25, 95% confidence interval (CI) 1.26–4.00, $p = 0.006$) and low- Δ PVO2 (HR 2.88, 95% CI 1.63–5.10, $p < 0.001$) were both independent predictors of the future cardiovascular event. Kaplan-Meier analysis revealed that those who had no improvement in both Δ PVO2 and Δ GNRI showed significantly lower event-free rate in poor baseline fitness cases (Log rank $p < 0.001$).

Conclusion: Improvement of nutritional status may contribute to the long-term risk reduction as well as the fitness improvement in cardiovascular patients. Nutritional intervention should be indispensable especially among poor fitness patients for better future outcome.

P5411
Low serum vitamin D levels are associated with polyunsaturated fatty acids, inflammation and long-term mortality in patients with acute cardiovascular disease

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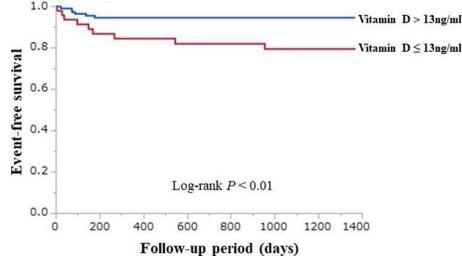
Background: Vitamin D (Vit-D) deficiency is associated with an increased risk of cardiovascular diseases (CVD) and mortality. However, the association of Vit-D with long-term mortality in patients with acute CVD remains unclear. Although omega-3 polyunsaturated fatty acids (PUFAs) such as eicosapentaenoic acid (EPA) may attenuate the association between Vit-D and inflammation, the association between Vit-D, PUFAs, and inflammatory markers in patients with acute CVD also remains unclear.

Purpose: The aim of this study was to clarify the association between serum Vit-D levels and omega-3 PUFAs and inflammatory markers and its prognostic value for long-term mortality in patients with acute CVD.

Methods: We recruited 198 consecutive patients with acute CVD admitted to the cardiac intensive care unit from April 2012 to December 2012. Serum levels of Vit-D, PUFAs [EPA, docosahexaenoic acid (DHA), and arachidonic acid (AA)], and inflammatory markers [C-reactive protein (CRP), interleukin-6 (IL-6), and tumor necrosis factor- α (TNF- α)] were measured after overnight fasting within 24 h of admission. Patients received hemodialysis and those with malignant diseases were excluded from this study.

Results: At baseline, serum Vit-D levels showed significantly negative correlations with inflammatory cytokines, including CRP, IL-6, and TNF- α ($r = -0.19$, -0.29 , and -0.21 , respectively). Significant positive correlation was also found between serum Vit-D levels and serum levels of EPA, DHA, AA, and EPA/AA ratio. We divided the patients into two groups based on the median level of EPA/AA ratio (0.25). In the low EPA/AA ratio group but not in the high EPA/AA ratio group, significant negative correlations between serum levels of Vit-D with CRP, IL-6, and TNF- α ($r = -0.23$, -0.43 , and -0.22 , respectively) were observed. During the 39-month median follow-up period, 15 (8.8%) cardiovascular (CV) deaths were identified. Serum Vit-D levels in the CV death group were significantly lower than those in the non-CV death group (13.5 ± 5.3 ng/mL, vs. 18.4 ± 8.1 ng/mL, $P = 0.02$). We divided the patients into high (> 13 ng/mL) and low (≤ 13 ng/mL) Vit-D groups based on the receiver-operator characteristics curve. The Kaplan-Meier curve revealed that the low Vit-D group had a significantly higher rate of CV deaths than the high Vit-D group (Figure). Multivariable Cox hazard analysis showed that Vit-D ≤ 13 ng/mL were an independent predictor of CV deaths (HR 10.6, 95% CI 1.86–86.93, $P < 0.01$).

Event-free survival curve for cardiovascular death in patients with acute cardiovascular disease



Conclusion: Serum Vit-D has negative correlations with inflammatory markers, especially in patients with an unfavorable PUFA balance indicated as low EPA/AA ratio. Furthermore, low Vit-D levels are independently associated with long-term cardiac mortality in patients with acute CVD.