CVD News and Research Updates
5 April 2016

Below is a summary of the latest research, reviews and reports in the field of cardiovascular disease, gathered by the Heart and Stroke Foundation South Africa. If you have any additions or comments, please get in touch.

HYPERTENSION

Predicting out-of-office blood pressure in the clinic (PROOF-BP):
Derivation and validation of a tool to improve the accuracy of blood pressure measurement in clinical practice

Sheppard J, *et al*.
March 2016
Link to abstract: click here

> *This study demonstrates that patient characteristics from a single clinic visit can accurately predict a patient's ambulatory blood pressure.*

Misdiagnosis of hypertension often occurs as a result of either the white coat effect or the masked effect, in which patients often have lower (white coat) or higher (masked) ambulatory/home blood pressure readings compared with clinic measurements. This study evaluated whether blood pressure and patient characteristics from a single clinic visit can accurately predict the difference between ambulatory/home and clinic blood pressure readings (the home-clinic difference). A linear regression model predicting the home-clinic blood pressure difference was derived in 2 data sets measuring automated clinic and ambulatory/home blood pressure (n=991) using candidate predictors identified from a literature review. The model was validated in 4 further data sets (n=1 172) using area under the receiver operator characteristic curve analysis. A masked effect was associated with male sex, a positive clinic blood pressure change, and a diagnosis of hypertension. Increasing age, clinic blood pressure level, and pulse pressure were associated with a white coat effect. Used as a triaging tool for ambulatory monitoring, the model improved classification of a patient's blood pressure status compared with other guideline recommended approaches (93% [92% to 95%] classified correctly; United States, 73% [70% to 75%]; Canada, 74% [71% to

77%]; United Kingdom, 78% [76% to 81%]). Usage of this prediction tool for triaging of ambulatory monitoring could result in more accurate diagnosis of hypertension and more appropriate subsequent treatment.

CIRCULATION

Enhancing cardiac rehabilitation with stress management training: A randomized clinical efficacy trial

Blumenthal J, *et al*.
March 2016
Link to abstract: click here

Cardiac rehabilitation enhanced by stress management training produced significant reductions in stress and greater improvements in medical outcomes compared with standard cardiac rehabilitation.

Despite considerable epidemiologic evidence that high stress is associated with worse health outcomes, stress management training (SMT) is not included routinely as a component of cardiac rehabilitation. Cardiac rehabilitation (CR) is the standard of care for patients with coronary heart disease (CHD). This study recruited 151 outpatients with CHD aged 36 to 84 years, who were randomized to 12-weeks of comprehensive CR or comprehensive CR combined with SMT (CR+SMT), with assessments of stress and CHD biomarkers obtained before and after treatment. A matched sample of R-eligible patients who did not receive CR comprised a No-CR comparison group. All participants were followed for up to 5.3 years for clinical events. Results indicated that patients randomized to the CR+SMT condition exhibited greater reductions in composite stress levels compared to those randomized to CR alone (P = 0.022). Both CR groups achieved significant and comparable improvements in CHD biomarkers. Participants in the CR+SMT group exhibited lower rates of clinical events compared with CR alone (18% vs. 33%, HR = 0.49 [0.25, 0.95], P = 0.035) and both CR groups had lower event rates compared to the No-CR group (47%, HR = 0.44 [0.27, 0.71], P < .001). The findings from this study indicate that stress management training may provide incremental benefit when combined with comprehensive cardiac rehabilitation and suggest that stress management training should be incorporated routinely into CR.

JACC: CARDIOVASCULAR IMAGING

The association of coronary artery calcium with noncardiovascular disease: the multi-ethnic study of atherosclerosis

Handy C, *et al*.
March 2016
Link to abstract: click here

Participants in this study with elevated coronary artery calcium were at increased risk of cancer, CKD, COPD, and hip fractures.

This study sought to determine if coronary artery calcium (CAC) is associated with incident noncardiovascular disease. Although CAC is considered to be a measure of vascular aging and is associated with increased risk of cardiovascular disease and all-cause mortality, the relationship between CAC and noncardiovascular disease is not well defined. A total of 6 814 participants from 6 MESA (Multi-Ethnic Study of Atherosclerosis) field centers were followed for a median of 10.2 years. Modified Cox proportional hazards ratios accounting for the competing risk of fatal coronary heart disease were calculated for new diagnoses of cancer, pneumonia, chronic obstructive pulmonary disease (COPD), chronic kidney disease (CKD), deep vein thrombosis/pulmonary embolism, hip fracture, and dementia. Results indicated that compared with those with CAC = 0, those with CAC >400 had an increased risk of cancer (hazard ratio [HR]: 1.53; 95% confidence interval [CI]: 1.18 to 1.99), CKD (HR: 1.70; 95% CI: 1.21 to 2.39), pneumonia (HR: 1.97; 95% CI: 1.37 to 2.82), COPD (HR: 2.71; 95% CI: 1.60 to 4.57), and hip fracture (HR: 4.29; 95% CI: 1.47 to 12.50). Those with CAC = 0 had decreased risk of cancer (HR: 0.76; 95% CI: 0.63 to 0.92), CKD (HR: 0.77; 95% CI: 0.60 to 0.98), COPD (HR: 0.61; 95% CI: 0.40 to 0.91), and hip fracture (HR: 0.31; 95% CI: 0.14 to 0.70) compared to those with CAC >0.

DIABETES CARE

Very-low-calorie diet and 6 months of weight stability in type 2 diabetes: pathophysiologic changes in responders and nonresponders

Steven S, *et al*.
March 2016
Link to abstract: click here

Results from this study indicated that a robust and sustainable weight loss programme achieved continuing remission of diabetes for at least 6 months.

This study tested the potential durability of the normalization of glucose control brought about by a very-low-calorie diet (VLCD) in individuals with type 2 diabetes mellitus (T2DM). People with a T2DM duration of 0.5-23 years (n=30) followed a VLCD for 8 weeks. All oral agents or insulins were stopped at baseline. Following a stepped return to isocaloric diet, a structured, individualized program of weight maintenance was provided. Glucose control, insulin sensitivity, insulin secretion, and hepatic and

pancreas fat content were quantified at baseline, after return to isocaloric diet, and after 6 months to permit the primary comparison of change between post-weight loss and 6 months in responders. Responders were defined as achieving fasting blood glucose <7 mmol/L after return to isocaloric diet. Results indicated that weight fell (98.0 ± 2.6 to 83.8 ± 2.4 kg) and remained stable over 6 months (84.7 ± 2.5 kg). Twelve of 30 participants achieved fasting plasma glucose <7 mmol/L after return to isocaloric diet (responders), and 13 of 30 after 6 months. HbA$_{1c}$ fell from 7.1 ± 0.3 to 5.8 ± 0.2% (55 ± 4 to 40 ± 2 mmol/mol) in responders (P < 0.001) and from 8.4 ± 0.3 to 8.0 ± 0.5% (68 ± 3 to 64 ± 5 mmol/mol) in nonresponders, remaining constant at 6 months (5.9 ± 0.2 and 7.8 ± 0.3% [41 ± 2 and 62 ± 3 mmol/mol], respectively). Henceforth, T2DM is a potentially reversible condition.

THE BRITISH MEDICAL JOURNAL

Antidepressant use and risk of cardiovascular outcomes in people aged 20 to 64: cohort study using primary care database

Coupland C, *et al*.
February 2016
Link to full text: click here

> *This study found no evidence that selective serotonin reuptake inhibitors are associated with an increased risk of arrhythmia or stroke/transient ischaemic attack in people diagnosed as having depression between the ages of 20 to 64.*

The objective of this study was to assess associations between different antidepressant treatments and rates of three cardiovascular outcomes (myocardial infarction (MI), stroke or transient ischaemic attack (TIA), and arrhythmia) in people with depression. A total of 238 963 patients aged 20 to 64 years with a first diagnosis of depression between 1 January 2000 and 31 July 2011 were included in the study. Exposures included antidepressant class, dose, duration of use, and commonly prescribed individual antidepressant drugs. Main outcome measures included first diagnosis of MI, stroke or TIA, and arrhythmia during five years' follow-up. During the follow-up period, 772 patients had a MI, 1 106 had a stroke or TIA, and 1 452 were diagnosed as having arrhythmia. No significant associations were found between antidepressant class and

MI over five years' follow-up. In the first year of follow up, patients treated with selective serotonin reuptake inhibitors had significantly reduced risk of MI (adjusted hazard ratio 0.58, 95% confidence interval 0.42 to 0.79) compared with no use of antidepressants; among individual drugs fluoxetine was associated with a significantly reduced risk (0.44, 0.27 to 0.72) and lofepramine with a significantly increased risk (3.07, 1.50 to 6.26). No significant associations were found between antidepressant class or individual drugs and risk of stroke or TIA. Antidepressant class was not significantly associated with arrhythmia over five years' follow-up, although the risk was significantly increased during the first 28 days of treatment with tricyclic and related antidepressants (adjusted hazard ratio 1.99, 1.27 to 3.13). In conclusion, this study found some indication of a reduced risk of MI with selective serotonin reuptake inhibitors, particularly fluoxetine, and of an increased risk with lofepramine.

THE OFFICIAL JOURNAL OF THE BRITISH DIETETIC ASSOCIATION

Plain water consumption in relation to energy intake and diet quality among US adults, 2005-2012

An R and McCaffrey J
February 2016
Link to abstract: click here

> *Promoting plain water intake could be a useful public health strategy for reducing energy and targeting nutrient composition in US adults.*

The present study investigated plain water consumption in relation to energy intake and diet quality among US adults. A total of 18 311 adults aged ≥18 years, from the National Health and Nutrition Examination Survey 2005-2012, were analyzed. Confounding bias from time-invariant unobservables (e.g. eating habits, taste preferences) were addressed using the first-difference estimator approach by using within-individual variations in diet and plain water consumption between two nonconsecutive 24-h dietary recalls. Results indicated that one percentage point increase in the proportion of daily plain water in total dietary water consumption was associated with a reduction in mean (95% confidence interval) daily total energy intake of 8.58 (7.87-9.29) kcal, energy intake from sugar-sweetened beverages of 1.43 (1.27–1.59) kcal, energy intake from discretionary foods of 0.88 (0.44–1.32) kcal, total fat intake of 0.21 (0.17–0.25) g, saturated fat intake of 0.07 (0.06–0.09) g, sugar intake of 0.74 (0.67–0.82) g, sodium intake of 9.80 (8.20–11.39) mg and cholesterol intake of 0.88 (0.64–1.13) g. Effects were similar across

race/ethnicity, education attainment, income level and body weight status. Slightly larger effects were observed among males and young/middle-aged adults than among females and older adults, respectively. Daily overall diet quality measured by the Healthy Eating Index-2010 was not found to be associated with the proportion of daily plain water in total dietary water consumption.

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Workplace interventions for reducing sitting time at work
Shrestha N, *et al*.
March 2016
Link to article: Click here

> *At present there is very low quality evidence that sit-stand desks can reduce sitting at work at the short term.*

Physical inactivity at work, particularly sitting, has increased in recent years. Long periods of sitting increase the risk for obesity, heart disease, and overall mortality. At this point, it is unclear whether or not interventions that aim to reduce sitting at workplaces are effective at reducing the amount of time spent sitting. This review aimed to determine the effects of such interventions. Literature and various databases were searched up to 2 June 2015. A total of 2 174 participants from high-income nations participated in 29 studies. Results indicated that sit-stand desks alone decreased workplace sitting by about half an hour to two hours per day. When combined with information and counseling, sit-stand desks reduced sitting at work in the same range. Sit-stand desks also reduced total sitting time and the duration of sitting episodes that last 30 minutes or longer. None of the other interventions, including active workstations, walking during breaks, and information and counseling, yielded a reduction in sitting time. In conclusion, at present there is very low quality evidence that sit-stand desks can reduce sitting at work at the short term. There is no evidence for other types of interventions. This calls for research to assess the effectiveness of different types of interventions for decreasing sitting at workplaces in the long term.

Active commuting and obesity in mid-life: cross-sectional, observational evidence from UK Biobank

Flink E and Cummins S
March 2016
Link to abstract: click here

> *Results from this study show robust, independent associations between active commuting and healthier bodyweight composition.*

Physical inactivity is a leading cause of obesity and premature mortality. The present study aimed to measure the relation between active commuting and obesity in mid-life using objectively measured anthropometric data from UK Biobank. Cross-sectional, observational data collected from individuals aged 40-69 years who visited 22 assessment centres across the UK between 2006 and 2010 were used. Commuting method was operationalised into seven categories, ordered to reflect typical levels of physical exertion. The outcomes assessed were BMI and percentage body fat. Sex-stratified multivariate linear-regression models were used. Results indicated that active commuting was significantly and independently associated with reduced BMI and percentage body fat for both sexes, with a graded pattern apparent across the seven commuting categories. In fully adjusted models, mixed public and active transport commuters had significantly lower BMI than their car-only counterparts (men: β coefficient $-1\cdot00$ kg/m^2 [95% CI $-1\cdot14$ to $-0\cdot87$], $p<0\cdot0001$; women: $-0\cdot67$ kg/m^2 [$-0\cdot86$ to $-0\cdot47$], $p<0\cdot0001$), as did cycling or cycling and walking commuters (men: $-1\cdot71$ kg/m^2 [95% CI $-1\cdot86$ to $-1\cdot56$], $p<0\cdot0001$; women: $-1\cdot65$ kg/m^2 [$-1\cdot92$ to $-1\cdot38$], $p<0\cdot0001$). Similarly, mixed public transport and active commuters had significantly lower percentage body fat compared with car-only commuters (men: $-1\cdot32\%$ [95% CI $-1\cdot53$ to $-1\cdot12$], $p<0\cdot0001$; women: $-1\cdot10\%$ [$-1\cdot40$ to $-0\cdot81$], $p<0\cdot0001$), as did cycling or cycling and walking commuters (men: $-2\cdot75\%$ [95% CI $-3\cdot03$ to $-2\cdot48$], $p<0\cdot0001$; women: $-3\cdot26\%$ [$-3\cdot80$ to $-2\cdot71$], $p<0\cdot0001$). The findings from this study support the case for interventions to promote active travel as a population-level policy response for prevention of obesity in mid-life.

CIRCULATION

Long-term effectiveness and safety of pravastatin in patients with coronary heart disease: 16 years of follow-up of the lipid study

Hague W, *et al*.
March 2016
Link to article: click here

> *The absolute survival benefit from 6 years pravastatin treatment appeared to be maintained for the next 10 years.*

The present study aimed to assess the long-term effects of treatment with statin therapy on all-cause mortality, cause-specific mortality, and cancer incidence from extended follow-up of the Long-term Intervention with Pravastatin in Ischaemic Disease (LIPID) trial. LIPID compared pravastatin and placebo over 6 years in 9 014 patients with prior coronary heart disease (CHD). After the double-blind period, all patients were offered open-label statin therapy. Data were obtained over a further 10 years from 7 721 patients. During extended follow-up, 85% assigned pravastatin and 84% assigned placebo took statin therapy. Patients that were assigned pravastatin maintained a significantly lower risk of death from CHD (relative risk (RR) 0.89; 95% confidence interval (CI) 0.81–0.97; *P*=0.009), from cardiovascular disease (RR 0.88; 95% CI 0.81–0.95; *P*=0.002), and from any cause (RR 0.91; 95% CI 0.85–0.97; absolute risk reduction 2.6%; *P*=0.003). Cancer incidence was similar by original treatment group during the double blind period (RR 0.94; 95% CI 0.82 to 1.08; *P*=0.41), later follow-up (RR 1.02; 95% CI 0.91 to 1.14; *P*= 0.74), and overall (RR 0.99; 95% CI 0.91 to 1.08; *P*=0.83). Treatment with statins does not influence cancer or death from noncardiovascular causes during long-term follow-up.

CIRCULATION

Abstract 42: Association of optimism with cardiovascular health: results from the Hispanic community health study/study (hchs/sol) of Latinos sociocultural ancillary study

Hernandez R, *et al*.
March 2016
Link to abstract: click here

> *This study offers preliminary evidence for an association between optimism and CVH in a large heterogeneous group of Hispanic/Latino adults.*

There exists substantial evidence linking positive psychological functioning to restorative health processes and favorable medial outcomes. The present study sought to examine the relationship

between optimism, an indicator of psychological functioning, and the American Heart Association defined concept of cardiovascular health (CVH) in Hispanics/Latinos of diverse backgrounds. Data from adults aged 18-75 that participated in the Hispanic Community Health Study/Study of Latinos (HCHS/SOL) Sociocultural Ancillary Study in 2010-2011 was analyzed. Optimism was assessed using the Life-Orientation Test-Revised, with scores ranging from 6-24 and higher scores corresponding with higher levels of optimism. American Heart Association standards were used to derive a composite CVH score with subsequent grouping into categories of poor (0-7 points), intermediate (8-11 points), and ideal (12-14 points). Metrics considered when calculating the overall CVH score included diet, body mass index, physical activity, cholesterol, blood pressure, fasting glucose, and smoking status. Results from a multinomial logistic regression indicated that among the 4 960 participants with complete data, 9.2% were categorized as having ideal CVH. Furthermore, participants with moderate levels of optimism were more likely to have intermediate [OR = 1.37: 95%CI = 1.08, 1.74] and ideal [OR = 1.61: 95%CI = 1.04, 2.48] CVH when compared to the least optimistic group. These results warrant future studies to explore the concept of optimistic bias and whether exaggerated levels of optimism are detrimental to health.

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