1787-A-1901

Nurse-delivered internet-based cognitive behavioural therapy reduces depression in patients with heart disease. The DOHART randomized controlled trial

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Background. Depression is common in patients with heart disease, however, effective intervention strategies targeting depression in heart disease are lacking. We therefore evaluated the effect of a nine-week nurse-delivered internet-based cognitive behavioural therapy (iCBT) program aimed to reduce depression in patients with heart disease.

Methods. A randomised controlled trial including 144 patients with heart failure, coronary artery disease, atrial fibrillation and/or atrial flutter and with at least mild depressive symptoms (i.e. Patient Health Questionnaire-9 (PHQ-9) ≥ 5 points) were recruited from five hospitals in Southeast Sweden. They were randomised to iCBT (n=72) or an active control participating in an online discussion forum (ODF, n=72). The iCBT program was tailored to suit the needs of patients with heart disease. Nurses with experience in cardiology gave feedback on homework assignments. Depression and health related quality of life (HR-QoL) was measured at baseline and nine weeks follow-up by the PHQ-9, Short Form 12 (SF-12) and EQ- VAS.

Results. Intention to treat analysis, showed that iCBT (n=72) compared to ODF (n=72) had a moderate treatment effect on depression (mean group difference -2·34 [95 % CI -3·58 to -1·10], p=0·0003, effect size d=0·62). We also found and moderate and significant effects by iCBT on EQ-VAS (Cohens d=0·62, p=0·0003) and on the mental component scale of the SF-12 (Cohens d=0·66, p<0·0001). In the physical component score of the SF-12, a small but non-significant improvement by iCBT was found (Cohens d=0·32, p=0·06). A total of 60% (n=43) in the iCBT group completed the full program (i.e. 7 modules), whereas 82% (n=59) completed more than half of the program (i.e. four or more modules).

Conclusion. Nurse-delivered and tailored iCBT program can reduce depression and improve Hr-QoL in patients with heart disease and enables treatment for depression in their own homes and at their own preferences of time.

1788-A-1901

Patients perceptions on how depression is addressed by health care professionals in cardiac care.

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Background: Depression is common in patients with cardiovascular disease (CVD) and is associated with poor outcomes. Depression is often under-treated in these patients, but little is known about CVD patients' perceptions of how depression has been addressed by health care professionals. The aim of this study was therefore to explore the perceptions of CVD patients with depression on how depression was addressed in the meeting with the health care professionals in cardiac care

Methods: A qualitative, semi-structured interview study was performed. In total, 20 CVD patients with depression were included. Collected data was analysed using inductive thematic-analysis according to Braun and Clarke; familiarization with data, initial coding, searching for themes, reviewing themes, defining and naming themes.

Results: The mean age of the patients was 62 years (34-79) and 45% were women. Three main themes emerged; (1) Perceptions of not being seen as a whole person, (2) Perceived that I was provided with help and (3) Did not perceive that I needed to address psychological distress. The CVD patients described that they did not receive not any help for their depression despite that they expressed a need for help, and that the staff only focused on the somatic. On the other hand, some patients described that they received help for depression, but this depended on patients´ own ability, and/or, having social support that could alert the patients to communicate their needs. Patients also described that they reduced the burden and/or did not recognise themselves to have depressive symptoms.

Conclusion: CVD patients described that depression was overlooked and that their psychological needs were not met, whereas others did not express feeling of being depressed. A good ability to address own needs, as well as having a good social support was helpful for receiving help with depression.

1789-A-1901

Lp-PLA2 activity and mass are associated with risk for symptomatic peripheral arterial disease

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Background : Prospective clinical plasma biomarker studies in peripheral arterial disease (PAD) have been hampered by the need for very large cohorts and long follow-up time.

Methods: Prospective longitudinal cohort of middle-aged individuals from the cardiovascular cohort of the Malmö Diet and Cancer study (n= 5550; 1991-94). The plasma biomarkers lipoprotein-associated phospholipase A2 (Lp-PLA2) activity and mass, proneurotensin, and C-reactive protein (CRP), and conventional risk factors at baseline were measured in patients with incident PAD during follow-up until December 31st, 2016, and compared to individuals without a diagnosis of PAD. The diagnosis of PAD could be validated and confirmed in 98%. Multivariable analyses were expressed in terms of hazard ratios (HR) per 1 standard deviation increment of each respective log transformed plasma biomarker in the Cox proportional hazard models.

Results: Cumulative incidence of PAD was 4.4% (men 5.9%, women 3.3%) during a median follow-up period of 23.4 years. Adjusting for age, gender, smoking, body mass index, hypertension, and diabetes mellitus, Lp-PLA2 activity (HR 1.33; 95% CI 1.17–1.52), Lp-PLA2 mass (HR 1.20; 95% CI 1.05–1.37), and CRP (HR 1.36; 95% CI 1.18 – 1.57), were all independently associated with incident PAD.

Conclusions: The plasma biomarkers Lp-PLA2 activity and mass, and CRP were markers of PAD risk, implying that they might be useful biomarkers for subclinical atherosclerosis and atherosclerotic disease.

1791-A-1901

Survival following coronary angiography due to cardiac arrest

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Background

Sudden cardiac arrest (SCA) affects around 300,000 people yearly in Europe and only 3-10% survive. An urgent coronary angiography if ST-elevation/left bundle branch block (LBBB) is recommended but otherwise it remains controversial. The purpose of the study is to assess 30-day and 12-month survival of patients with SCA who underwent coronary angiography.

Methods

The SCAAR and RIKS-HIA registers were used to identify patients who underwent angiography due to SCA between January 2010 and December 2017 in Region Gävleborg, Sweden. Medical records (Melior™) were used to validate data.

Results

In the 169 patients (78.7% males) the mean age at cardiac arrest (66.7±10.4 years) was similar between the sexes (p=0.335). The majority (n=136; 81.4%) experienced out-of-hospital SCA. Patients' characteristics: smoking history (46.1%), hypertension (52.7%), hyperlipidemia (33.7%), diabetes (20.7%), heart failure (19.5%), and previous myocardial infarction (27.2%). Most patients (75.6%) had a shockable rhythm at presentation and 68.1% had return of spontaneous circulation ≤30 minutes. The ECG showed ST elevation in 37.9% and LBBB in 8.9%, respectively. Percutaneous coronary intervention (PCI) was performed in 57.4% of the patients of whom the culprit lesion was the left anterior descending artery in 52.6%. The cumulative survival (at 30 days and 12 months: 57.1% and 51.2%, respectively) was not significantly different between males/females (p=0.528).The cumulative survival for patients who underwent urgent angiography (75.1%) was at 30 days 46.8% and at 12 months 42.9%. The 30-day and 12-month survival for patients who underwent angiography ≤24 hours (13.6%) was 78.3% and 60.9%, respectively. Angiography >24 hours (11.2%) after cardiac arrest represented a group with excellent survival; all patients were alive at 30 days and 5.3% dead at 12 months.

Conclusion

PCI was performed in about half of the patients. Half of the patients survived the first 30 days and after one year almost all were still alive.

1807-A-1901

Role of baseline 12-lead ECG in predicting syncope caused by arrhythmia in patients wearing an implantable loop recorder

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Aim: To evaluate the role of baseline 12-lead ECG in predicting the syncope mechanism during continuous monitoring with an implantable loop recorder (ILR).

Methods: Consecutive patients with syncope implanted with an ILR were enrolled. Baseline 12-lead ECG was related to ECG diagnosis derived from ILR tracings at the time of syncope recurrence.

Results: 300 patients with a mean age of 66 16 years were included, of which 49% (146) received an ILR guided diagnosis during follow-up. Patients with abnormal baseline ECG received more frequently an ILR guided diagnosis compared to those with normal baseline ECG (59% vs 44%, p=0.018). For arrhythmic syncope, the corresponding frequencies were 45% vs 26%, p=0.001.

In total thirty-three patients had bifascicular block at baseline ECG and in this group an ILR guided diagnosis was significantly more common 76% (25/33) compared to those with normal baseline ECG 44% (90/205), (p<0.001). Of those 96% (24/25) were diagnosed with arrhythmic syncope, 23 due to bradyarrhythmia. Bifascicular block occurred almost exclusively among those ≥ 60 years (31 of 33 bifascicular blocks). After logistic regression the adjusted odds ratio for arrhythmic syncope was significant for bifascicular block 5.5 (2.3-13.2, p<0.001) but age was no longer an independent risk factor.

Patients with bifascicular block (median 3 months) had shorter time to diagnosis compared to those with normal baseline ECG (median 9 months) or AVB I (median 7 months), p=0.004.

Conclusion: A baseline 12-lead ECG with bifascicular block was a strong predictor for syncope during follow-up, almost exclusively due to bradyarrhythmia. Bifascicular block at baseline was found almost exclusively among those above 60 years of age and we find it reasonable to select permanent pacing instead of an ILR for patients above 60 years of age with bifascicular block and unexplained syncope. No other ECG findings were associated with the ILR outcome.

1810-A-1901

Peripheral Artery Disease in patients with Acute Myocardial Infarction

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Aim: To describe the population of patients with previously diagnosed peripheral artery disease (PAD) experiencing a myocardial infarction (MI) and to investigate one-year major adverse cardiac events (MACE: all-cause mortality; reinfarction; stroke; heart failure hospitalization) following MI.

Background: MI patients with PAD constitute a high-risk population with adverse cardiac outcomes. Contemporary real-life data regarding the clinical characteristics of this patient population and clinical event rates following MI remain scarce.

Methods: This observational follow-up study included all MI patients presenting with ST-elevation MI or non-ST-elevation MI between January 1st, 2005 and December 31st, 2014 with (n=4,213) and without (n=106,763) a concurrent PAD diagnosis, identified in the nationwide SWEDEHEART registry (PAD prevalence: 3.8%) and the National Patient Registry. Cox proportional hazard models were applied to compare outcome between the two populations.

Results: MI patients with PAD were older and more often burdened with comorbidities such as diabetes, hypertension and previous MI (Table 1). After adjustments, PAD was significantly associated with higher rates of MACE (HR 1.40 95% CI 1.31-1.49), mortality (HR 1.60 [1.45-1.78]), reinfarction (HR 1.49 [1.33-1.67]), stroke (HR 1.28 [1.07-1.54]), heart failure (HR 1.30 [1.20-1.41]) and bleeding (HR 1.26 [1.09-1.47]) at one year (Table 2).

Conclusion: A concurrent PAD diagnosis was independently significantly associated with higher rates of adverse outcomes following MI in a nationwide real-life MI population. The low prevalence of PAD compared to previous studies suggests significant underdiagnosing. Future studies should investigate if PAD screening with ankle-brachial index may increase diagnosing and lead to improved treatment of polyvascular disease.

1811-A-1901

Nationwide implementation of sacubitril/valsartan in Sweden – patient selection, titration patterns and treatment persistence

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Background and aim

Sacubitril/valsartan (s/v) improves outcomes in heart failure (HF) with reduced ejection fraction, and is reimbursed in Sweden since April 2016. We studied dosing strategies, treatment persistence and characteristics of patients prescribed vs not prescribed s/v.

Methods

Included s/v patients had ≥1 dispensed s/v prescription in the Swedish Prescribed Drug Registry. Three populations were studied: the entire s/v population (s/v complete), a s/v subpopulation with additional background data from SwedeHF (s/v SwedeHF), and a comparator HFrEF (LVEF<40%) population from SwedeHF without s/v prescription (non-s/v).

Results

Between Jan 2016 – Dec 2017 we identified 2,037 patients with ≥1 s/v prescription (s/v complete), of which 1,144 were registered in SwedeHF (s/v SwedeHF) and. 7,861 HFrEF patients not prescribed s/v (non-s/v). S/v patients were younger, more often male and markedly symptomatic (NYHA III/IV), had higher income, lower NT-proBNP, higher Hb and eGFR, lower systolic blood pressure and heart rate, and had a substantially higher use of HF and other therapies. As initiation dose 37.8% received 24/26 mg; 53.5% 49/51 mg; and 8.7% 97/103 mg s/v b.i.d.

Up-titration to target dose was more common in patients initiated on 49/51 mg vs 24/26 mg (66.7% vs 31.0%, total population 57%) and few patients initiated on 49/51 and 97/103 mg s/v were permanently downtitrated throughout 6 months follow-up (1.5 and 1.9% respectively). Estimated treatment persistence for any dose at 360 days was 82%.

Conclusion

During the early implementation phase in Sweden, patients receiving s/v were younger and sicker. However, both dose tolerability and drug persistence in real-world are fairly good.

1813-A-1901

Poor agreement between invasive and non-invasive measured pulmonary capillary wedge pressure one year after heart transplantation

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Background: Severe diastolic dysfunction is often observed after heart transplantation and thus it is of importance to regularly determine left ventricular filling pressure.

Catheterization is the gold standard for measurement of pulmonary capillary wedge pressure (PCWP). However, this invasive method is time consuming, expensive and stressful for the patients, and a non- invasive method that could replace this procedure would be of significance.

The aim of this study was to observe the agreement between invasive filling pressure and

non-invasive estimated filling pressure in heart transplanted patients.

Methods: Thirty three one year post transplantation patients (mean age 55±12 years 12 males, 11 women) from Sahlgrenska University Hospital were included in the study.

From pulsed wave and tissue Doppler imaging the following parameters were measured: isovolumetric relaxation time ms, atrial wave velocity (A), early diastolic filling (E), early diastolic annular velocity (e´), (cm/s respectively) and E/e´ratio.

Based on these values, a non-invasive PCWP was estimated by using the equations by Nagueh, and a Bland Altman analyse was achieved to observe the agreement with PCWP value from heart catheterization.

Results: The mean value of invasive and non-invasive PCWP measurement was 8.22±3.11mmHg giving a mean differences of -5.22±3.48 with a coefficient of variation of 30%. Likewise, E/é (mean) shows any correlation with invasive PCWP (R= 0.063, p=0.745).

Isovolumetric relaxation time correlate weakly with the invasive PCWP: (R= -0.384, $p<0.05$)

Conclusion: Insignificant agreement was observed between invasive and non-invasive methods with respect of PCWP in heart transplanted patients. Heart catherization is still Gold standard to measure left ventricular filling pressure in heart transplanted patients.

1816-A-1901

Depressive symptom and self-care behavior in heart failure patients: Effects of internet based-cognitive behavioural therapy

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Background: In patients with chronic heart failure (HF) depressive symptoms can be a barrier to perform adequate self-care behaviour. Treatment of depressive symptoms in HF patients may be needed to improve self-care behaviour.

Aim: To investigate the impact of internet based-cognitive behavioural therapy (I-CBT) on self-care behaviour in HF patients and to study the association between changes in depressive symptoms and changes in self-care behaviour.

Methods: Sub-analysis of data collected in a pilot randomised controlled study evaluating the impact of 9 weeks I-CBT (n=25) on depressive symptoms in HF compared to a moderated on-line discussion forum (ODF) (n=25). The I-CBT program included homework assignments and written feedback by a nurse. In week 2 and 3 the I-CBT program included psychoeducation about HF self-care whereas patients in the ODF could discuss related HF topics and self-care in written. Patient Health Questionnaire- 9 was used to measure depressive symptom at baseline and at 9 weeks follow-up. The European Heart Failure Self-care Behaviour Scale-9 (EHFScBS) (i.e. the summary score and the subscales autonomous based, provider based and consulting behavior) measured self-care behaviour at baseline, 3 weeks and at the 9 weeks follow-up.

Results: At 3 weeks after the start of the intervention, the total self-care score on the three subscales of the EHFScBS increased in both groups.After 9 weeks all self-care scores in the ODF-group had returned back to baseline levelsbut in the I-CBT group autonomous-based (weighing, exercise, fluids) and provider-based self-care (medications, diet) remained increased, the latter being statistically significant (p=0.05). A significant correlation between improvement in symptoms of depression and improvement in autonomous-based self-care was found (r=0.34, p=0.03).

Conclusion: Improvement in depressive symptoms was associated with improved autonomous-based self-care. I-CBT for depression in HF may benefit aspects of self-care that are vital to improve survival

1817-A-1901

Nationwide comparison of long term survival and cardiovascular morbidity after acute aortic aneurysm repair in patients with and without type 2 diabetes

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Background:

Epidemiological data indicate decreased risk for development, growth, and rupture of abdominal aortic aneurysm (AAA) among patients with type 2 diabetes mellitus (DM). We therefore evaluated mortality and cardiovascular morbidity after acute repair for AAA in diabetic and non-diabetic patients.

Methods:

In this nationwide observational cohort study of patients registered in the Swedish Vascular Registry and the Swedish National Diabetes Register, we compared mortality and morbidity after acute open (n=1357 [61%]) or endovascular (EVAR, n=860 [39%]) repair for ruptured (n=1469 [66%]) or otherwise symptomatic (n=748 [34%]) AAA in 363 patients with and 1854 without DM with propensity score analysis adjusted for the following: age, gender, smoking, rupture or not, endovascular or open repair, previous myocardial infarction, coronary heart disease, cerebrovascular disease, atrial fibrillation, congestive heart failure, renal, malignant, liver, or psychiatric disorders, peripheral arterial disease, chronic obstructive pulmonary disease, lipid- and blood pressure lowering drugs, aspirin, anticoagulation, ACE-inhibitors, angiotensin receptor, alpha-, beta-, and calcium channel blockers, diuretics, digoxin, income, civil status, country of birth, and education.

Results (figure):

Follow up was 3.91 years for patients with diabetes, and 3.18 years for those without. In propensity adjusted analysis diabetic patients showed lower total (relative risk [RR] 0.75, 95% confidence interval [CI] 0.59-0.95; p=0.016) and cardiovascular (RR 0.17, CI 0.06-0.50; p=0.01) mortality than those without diabetes, whereas there were no differences in rates of major adverse cardiovascular events (RR 1.10, CI 0.87-1.42; p=0.42), myocardial infarction (RR 1.36, CI 0.70-2.63; p=0.37), or stroke (RR 1.31, CI 0.84-2.03; p=0.23).

Conclusion:

After the above adjustment, patients with type 2 DM had lower rates of both total and cardiovascular mortality after acute AAA repair than those without diabetes, whereas rates of cardiovascular events, AMI, and stroke did not differ between groups. This might be explained by putative protective effects of DM upon the aortic wall.

1818-A-1901

Pheochromocytoma – an ECG diagnosis?

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Introduction: Ventricular tachycardia (VT) occurs predominantly in patients with structural heart disease but may occur even in patients with structurally normal hearts. Pheochromocytoma is a rare catecholamine-secreting tumor in the adrenal medulla. Patients present with headache, palpitations, diaphoresis and hypertension. In rare cases, first symptoms can be of cardiac origin.

Bidirectional ventricular tachycardia (BDVT) is a rare arrhythmia most often seen in patients with catecholaminergic polymorphic VT (CPVT), elicited by physical exercise, and in digoxin toxicity. In CPVT, a genetic defect in the calcium (Ca) channels of the sarcoplasmatic reticulum causes increased diastolic Ca leakage, leading to delayed after-depolarizations (DAD). In digoxin toxicity increased natrium/Ca exchange causes Ca overload with the same result. BDVT occurs when a premature ventricular contraction in one part of the conduction system elicits another, by DADs and vice versa (“conduction system ping pong”).

Case presentation #1: A 44-year old woman was admitted to the cardiac ward with palpitations and chest pain. Palpitations had been occurring since a few years, but had always terminated within 10 minutes. On telemetry, episodes of VT with changing frontal plane axis (bi-directional VT (BDVT), Fig. 1)) were observed.

Case presentation #2: A 61-year old woman had experienced intermittent palpitations and was referred for Holter monitoring, on which short episodes of VT during walking were present. Two weeks later, she was admitted to the emergency department due to general malaise and BDVT was registered on telemetry.

In both patients, a CT scan showed an adrenal gland tumor and high catecholamine levels confirmed the diagnosis of pheochromocytoma. Both patients recovered completely after surgery.

Conclusion: The abnormal catecholamine secretion in pheochromocytoma can explain BDVT in patients without genetic CPVT or digoxin toxicity. BDVT can be an important clue in the diagnosis of pheochromocytoma.

1821-A-1901

Have mHealth solutions for heart failure really been evaluated in the appropriate populations? A systematic review

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Background

Recently published articles have highlighted that pharmacological studies often have included a too young heart failure (HF) population. With digital health booming, there is a need to assess to what extent mHealth has been evaluated in the relevant population, before jumping on the bandwagon.

Methods

Literature search on PubMed and the Cochrane database, with results from 1998-2018, search query “mHealth heart failure”. Other systematic reviews were also mined for references. Studies were included if they met the following criteria: 1 – included exclusively HF-patients, 2 – reported age, 3 – used a randomized control trial or a quasi-experimental design and 4 - tested an intervention using a mobile device (by itself or as part of a system).

Results

First searches yielded 953 citations, reduced to 116 after title reviews. These abstracts were reviewed, leaving 41 for full-text review, resulting in 28 articles being included in the final analysis. With a more formal definition of mHealth, 28 (with liberal definition) were reduced to 17. Both definitions were included in the analyses.

Liberal definition (28 articles): 7 249 patients, mean age 65, mean system adherence (MSE) 67 % and 74 % of the studies reporting clinical outcomes were negative. Only three studies (11 %) had a mean age at or above the mean age of HF patients.

Formal definition (17 articles): 1 377 patients, mean age 62, MSE 68 % and 71 % of the studies reporting clinical outcomes were negative. Only one study (6 %) had a mean age at or above the mean age of HF patients.

Conclusion

A vast majority of clinical studies are not evaluating the interventions in the appropriate population. More research is needed to evaluate mHealth interventions for the older HF patients.

1823-A-1901

Hands-On: A comparison between two handheld ECG recorders with regard to rhythm analysis and feasibility

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Background

The use of ambulatory handheld ECG recorders for rhythm event recording is increasing. The aim of this study was to compare Zenicor and MyDiagnostick, two of the most common ambulatory ECG-recorders used within the Swedish health care, with regard to EKG-quality, manageability and rhythm analysis.

Methods

A subgroup of participants within the STROKESTOP-2-study daily performed four 30-second recordings with Zenicor and two 60-second recordings with MyDiagnostick for two weeks. The participants graded each system with regard to manageability using a five-degree scale in which 1 stands for that the unit was very hard to use and 5 stands for that the unit was very easy to use. Two cardiologists independently evaluated the ECG-quality and performed a rhythm analysis, which was compared with the rhythm analysis of each module.

Results

Nineteen individuals were included and the number of ECG-recordings was 1422. According to both cardiologists, no new case of atrial fibrillation was detected. Both algorithms graded over 90% of the registrations as non-atrial fibrillation, but Zenicor graded significantly more registrations as possible atrial fibrillation. The ECG-quality was significantly better on Zenicor compared to MyDiagnostick expressed as the proportion of recordings with at least 50% interpretable heart rhythm. The mean user grade for both systems was equal and remarkably high, 4,8 ± 0,6 and 4,8 ± 0,5 respectively.

Conclusions

This pilot study indicates that Zenicor and MyDiagnostick both are similar in manageability and in correctly detecting sinus rhythm, but that the Zenicor algorithm may have higher sensitivity to ECG deviations compared with the MyDiagnostick algorithm.

1826-A-1901

Comparison of Loop diuretics; intravenous bolus injection versus continuous infusion in hospitalized patients with moderate to severe congestive heart failure

Rana Sager, Markus Tobin, Sofia Gerward, Marie-Louise Edvinsson

Background

Loop diuretics play a key role in treatment of individuals with acute decompensated congestive heart failure (CHF). This treatment is frequently used to decrease fluid accumulation in hospitalized patients with decompensated HF. NT-proBNP is the standard biomarker of wall strain, overload and to determine the severity of CHF. However the strategy behind how the physician decide what route of administration of loop diuretics for ordination; intravenous bolus injection (IV), or as a continuous infusion (CI) is not known. We aimed to investigate benefits or worse outcome due to the chosen route.

Methods

Forty subjects, twenty (8 male, 12 female) in each group with diagnosed severe CHF were included consecutively at University Hospital, Emergency Internal Medicine clinic. All were treated with loop diuretics under the admissions period as IV or CI (mean; age in the groups 85 vs. 80 yrs.). Pared t-test was used for statistics, p-value of <0.05 was considered as significant.

Results

The use of CI was more frequent in patients with higher NT- proBNP (15901±2977 vs. 9640±2153 ng/L; $p<0.05$) and lower blood pressure (116/73±4/3 vs. 140/82±4/3 mm/Hg; $p<0.05$) as compared to IV administration. There was no difference in glomerular filtration rate (39.5±3 vs 36±3 mL/min/1.73m2; $p>0.9$). Patients treated with CI had 40% mortality rate compared with IV group (10%) adjusted with 3 months period. Five patients died as inpatient in CI and one in the IV group, after discharge.

Conclusion

We conclude that the use of CI is preferred in advanced stage of acute severe CHF but the rationale is not known. Moreover this group had significantly higher NT-ProBNP levels and lower blood pressure compared to the IV group which may explain the high mortality rate.

1827-A-1901

Former and present experience with physical activity in patients with heart failure.

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Introduction: Despite the known benefits of physical activity (PA) in patients with heart failure (HF) information on factors that encourage or discourage patients from being active. From the general population it is known that former PA can influence current levels, but information on the HF population is lacking. The purpose of this study was to describe the experiences of PA in patients with HF receiving motivational support to exercise when participated in the control group of an exercise trial.

Methods: A qualitative descriptive study design was used with individual interviews with 15 patients with heart failure (6 women, mean age 67 range 37–82). Patients were recruited within a control group of a PA intervention, the HF-Wii study. The control group receive motivational telephone support to exercise during 12 weeks. Data were analysed inductively using qualitative content analysis.

Results: Five categories described patients experiences: 1) Adapting former physical activities, (2) Facilitators for physical activity, (3) Barriers towards physical activity (4) Effects of the motivational support on physical activity (5) Effects of follow up on physical activity

Patients adapted their speed and distance in walking or biking and took regular breaks when necessary. Others choose different kind of activities like specific facilities for elderly. Patients described that t preferred to adapt the activities they did when they were younger or before their HF (for example using a golf-cart instead of walking on a golf course). Facilitators for PA were the influence of others, environmental facilitators (an attractive scenery) or having a job that promotes PA. Other facilitators including using tools (diaries) and experiencing physical benefits

Barriers experienced to being active included negative feelings (boring), symptoms, lack of knowledge and time, and environmental challenges (snow outside).

Some patients felt that receiving motivational support from health care professionals and participating in follow-up of a research study encouraged them to be more physical active, where others did not change their PA due to the support. Participating in follow-ups of a study could make patients feel obligated towards the research team to comply with the PA advice and gave a feeling of security.

Conclusions: This study showed that one way of helping patients increase their activity level might be to focus on former physical activities and search for possibilities to adapt those activities. Additionally, the results show that health care professionals assessing patients' barriers and facilitators is important to give individualized and tailored advice. Being in a control group and receiving motivational support had mixed effects from no change in activity to feeling encouraged or obliged to be physically active. Study follow up increased security and motivation in PA.

1828-A-1901

Development of the CUE tool through an e-Delphi study: The Credible and Usable Evaluation of patient education tool for web-sites

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Introduction: Patients are increasingly searching for information about their medical condition on the Internet. The information available on the Internet is excessive and not all information that can be found on the internet is of acceptable quality or can be recommended. Therefore, it is important for clinicians to be able to assess the quality of websites which contain information for patients or are intended to educate patients. The purpose of this study was to develop a clinical tool for health care professionals to help them assess the quality of websites containing medical information for patients

Method: The method used in this study was a e-Delphi in three rounds.

In round one, items on usability and content were created based on available literature on website evaluation and the general information needs of patients to assess the quality of patient information and important aspects for usability of web-sites. The theoretical perspective of empowering patient education guided the development of the tool. These items created from the literature search were sent out for evaluation to 34 health-care professionals in 6 countries. Health care professionals were selected based on their publications within patient education and/or were members of the CESAR network, a professional research network in Sweden. Items were selected for round 2, if more than half of the participants rated them as important or very important and the same method applied for round 3. Additionally, in round three, participants were asked if the remaining items were clear, if they missed any important items and to give suggestions on a scoring system of the tool.

Results: In total 19 of 34 health-care professionals responded to the invitation of participating in the study. Of the 67 items initially created 41 items (29 on usability, 12 on content) were rated as important or very important and selected for further evaluation in round two. In round 2, a total of 18 health-care professionals responded and 19 items were selected (9 usability, 10 content) for further evaluation. As a result of round 3, two items were put together as one, leaving the instrument with 18 items in total (figure). The scoring system preferred was a summative score for usability and content ranging from 0-100.

Discussion: Because patients are more and more searching for information about their medical condition online, it is important to develop a tool for healthcare professionals so they can advise patients on suitable and reliable websites from which they can seek information. The CUE tool developed in this study will be further tested within the clinical setting.

1846-A-1901

Self-care management intervention in heart failure

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Background

In elderly heart failure (HF) patients there is little experience regarding evaluation of digital self-care management interventions. Previous digital interventions studies in HF has a mean age of 62-65 years.

Purpose

Evaluate a novel home-based self-care intervention in an elderly HF population.

Methods

HF patients were enrolled at five general practitioners and two hospitals and randomized 1:1 to intervention (IG) or control group (CG). The intervention group received a tablet computer with education and symptom monitoring, wirelessly connected to a weight scale and incorporating a titration module for loop-diuretics. Baseline data was collected at randomization and the number of days lost to HF-hospitalizations was analysed using negative binomial regression. Patients will be followed up after eight months, and this is an interim analysis of data after three months.

Results

One hundred patients were randomized to IG, n=50 and CG, n=50. The groups were well balanced at randomization, except for a higher diastolic blood pressure in the CG. The mean age was 79±9, 59 % were male. Five percent were NYHA-class I, 64 % NYHA-class II and 31 % NYHA-class III. There were no significant differences in terms of pharmacological treatment, self-care behaviour or quality of life. A total of 88 HF-related in-hospital days were registered (61 days in the CG group and 27 in the IG). The unadjusted risk ratio between IG and CG was 0.44 (CI: 0.24-0.81) for HF-related in-hospital days. The log rank test for time to event was significant with p-value 0.046. There was no group difference in number of admissions.

Conclusions

This interim analysis indicates a significant reduction of in-hospital days due to HF by 56 % in this elderly HF population.

1850-A-1901

The relationship between longitudinal function and symptoms in patients with heart failure with reduced ejection fraction

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Background

Heart failure (HF) is one of the most serious diseases affecting the world today. The longitudinal shortening and lengthening, measured as atrioventricular plane displacement (AVPD) or mitral annular plane systolic excursion (MAPSE), have become recognized to infer additional prognostic information to ejection fraction (EF) and infarction using late gadolinium enhancement on cardiovascular magnetic resonance (CMR). New York Heart Association (NYHA) classification is a widely used tool for grading symptoms in patients with heart failure. Although both NYHA class and AVPD have prognostic information, comparisons of AVPD with NYHA class are missing. Therefore, the aim of this study was to relate AVPD to NYHA class in patients with HF with reduced ejection fraction (HFrEF). We hypothesize that with increased NYHA class there is a concomitant decreased AVPD.

Methods

144 patients with HF and EF below 40% (62±12 years, 109 male) and 20 age-matched controls (62±11, 12 male) were imaged using CMR. Long-axis cine images were acquired and analysed using a freely available software (Segment 2.2, Medviso, Lund). Results are presented as mean±SD and differences between NYHA classes are compared with ANOVA using post hoc analysis.

Results

Subject characteristics are shown in Table 1. Mean AVPD for patients was 7.8±-2.5mm and mean NYHA classification was 2.8 ±0.8. There was a difference in AVPD between NYHA II (8.8±2.8 mm) and NYHA IV (6.6±1.8 mm, p=0.001, Figure 1A). AVPD for all NYHA classes were decreased compared to controls (p<0.001). Normalized AVPD (with body surface area) differed between NYHA I vs NYHA IV (p=0.03, Figure 1B) and NYHA II vs NYHA IV (p=0.006, Figure 1B).

Conclusion

Left ventricular AVPD is reduced in all NYHA classes and there is a small stepwise decrease in AVPD with increasing NYHA class. Future research needs to investigate whether AVPD can add additional prognostic information compared to NYHA classification.

1853-A-1901

Decreased atrioventricular plane displacement after acute myocardial infarction yields a concomitant decrease in stroke volume – Opportunity for future devices

Jonathan Berg, Robert Jablonowski

Background

Prognosis in heart failure is poor and new and effective therapies are important. One novel device strategy is to improve longitudinal ventricular shortening and lengthening during the cardiac cycle which attributes 60% of stroke volume (SV). For such device development, information on how SV is dependent on atrioventricular plane displacement (AVPD) in different acute myocardial infarction (AMI) models is needed. Therefore, the aim of this study was to investigate the relationship between SV and AVPD before and after an AMI.

Material and methods

Serial cardiac magnetic resonance imaging was carried out before and 1-2 hours after infarction in a Microembolization (ME) model (12 pigs) and an Ischaemia/Reperfusion (I/R) model (9 pigs). Cine images were analyzed for cardiac function and AVPD measurements and late gadolinium enhancement images for infarct size. Pearson correlation coefficients and paired t-test were used.

Results

AVPD decreased after AMI ($p<0.05$) both in the infarcted and remote myocardium with a concomitant SV decrease ($p<0.001$) in both groups (Figure 1). SV and AVPD correlated better in the Ischaemia/Reperfusion group ($r=0.81$) than the Microembolization group ($r=0.50$, Figure 2) and the Ischaemia/Reperfusion group also had larger infarct sizes and AVPD decreases ($p<0.05$ for all) than the Microembolization group. A-wave AVPD remained unchanged ($p=0.41$) while E-wave AVPD decreased ($p<0.001$) after AMI (Figure 3).

Conclusion

AVPD is globally reduced after AMI and is linked to a decreased SV. The relationship between decreased AVPD and SV better suited ischemia/reperfusion infarcts than microembolization infarcts. These findings may well set a foundation for evaluating and developing therapies as well as future devices for augmenting AV-plane motion during the cardiac cycle.

1865-A-1901

First Scandinavian experience with a transapical transcatheter mitral valve with apical tether

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Objective

Transcatheter mitral valve replacement (TMVR) has recently been introduced as an alternative treatment option for mitral regurgitation. We present our single-centre first experience with screening and implantation of a transapical transcatheter mitral valve with apical tether.

Methods

Twenty seven patients with MR grade 3 and 4 were screened based on study inclusion/exclusion criteria, echocardiography and computed tomography imaging. All patients were evaluated by the centre's Heart Team, followed by transcatheter valve's internal screening process for the early feasibility trial. Patients who failed the screening criteria were considered for alternative treatments. CT reconstruction for valve sizing, implant angles and depth was done. The included patients underwent left mini thoracotomy and transapical implantation of the catheter valve under general anesthesia with transesophageal echo and fluoroscopy guidance .

Results

Of the twenty seven patients screened for TMVR, fifteen patients failed screening and twelve passed. The patients who failed screening were more often older, female and smaller in stature than those who passed screening. The main reason for patients to fail screening changed during the study period from large annular dimensions to a small predicted neoLVOT. Nine of the twelve patients that passed screening were treated with the transapical transcatheter heart valve.

Of the fifteen patients that failed the screening, five had open surgery ,one patient died before screening process had finished and one died later on. All nine patients who underwent the transcatheter mitral valve procedure were successfully treated without mortality during the observation time. The longest observation time for two patients was three years.

Conclusion

TMVR is an effective and safe treatment for well-selected patients with symptomatic MR, however pre-procedural planning with CT reconstruction is mandatory. For patients who fail the screening process, MitraClip or open surgical valve repair or replacement are potential options.

1866-A-1901

Evaluation of left atrial volume in apical 2-chamber view, recorded with two different echocardiographic transducers (S5 -1 and X5-1)

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Background: Left atrial size has a prognostic significance in cardiology. There is ecumenical agreement that measurement of left atrial volume (LAV) is the best way to evaluate left atrial size. Currently, S5-1, a phased array transducer, is used as the first choice to depict the 2-dimensional (2D) 4- and 2-apical chamber views where the transducer is manually rotated approximately 60 degrees counterclockwise from an apical 4-chamber view to acquire an apical 2-chamber view. X5-1, a matrix array transducer, is a clinical option for collecting the same 2D projections, but it has not been adequately assessed against the S5-1 transducer with LAV in consideration. Using X5-1 transducers, the direction of the ultrasound beam can be changed from the 4-chamber view to the apical 2-chamber view without turning the transducer itself, using the transducer's ability to steer the beam 360 degrees, see image 1. The purpose of the present study was to investigate whether there is a statistically significant difference in the LAV in apical 2-chamber views depending on the choice of transducer.

Method and material: The study included 50 patients who were referred for an echocardiographic examination. Echocardiographic images were collected with both transducers, from patients with normal and with abnormal left atrial sizes and with sinus rhythm. LAV was measured using Simpson's biplane method according to current guidelines.

Result: There was a significant correlation between the mean of LAV, measured in images obtained by the two different transducers (r=0.98, P 0.0001). The Bland-Altman analysis showed a statistically significant agreement in LAV measurement between the two methods.

Conclusion: Due to lack of prior studies in this area, the results of this study cannot be compared to others. This emphasizes the importance of further investigations to achieve a confirmed and more reliable result where a larger number of patients may be of value.

1867-A-1901

Loss in life expectancy after surgical aortic valve replacement: SWEDEHEART observational study

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Background: Contemporary data on loss in life expectancy after aortic valve replacement are scarce, particularly in younger patients. We performed a nationwide observational cohort study analyzing the long-term relative survival and the estimated loss in life expectancy after aortic valve replacement.

Methods: We included 24 781 patients who underwent primary, surgical aortic valve replacement in Sweden between 1995 and 2013 from the Swedish Web-system for Enhancement and Development of Evidence-based care in Heart disease Evaluated According to Recommended Therapies (SWEDEHEART) register. Individual level linking with other national health-data registers was performed to obtain baseline characteristics and vital status. The expected survival from the general Swedish population matched by age, sex and year of surgery was obtained from the Human Mortality Database. The relative survival was used as an estimate of cause-specific mortality. We used flexible parametric models based on relative survival to estimate the loss in life expectancy.

Results: The mean follow-up was 6.7 years. The 19-year observed, expected and relative survival was 22%, 34%, and 65% (95% CI: 61%-69%), respectively. The loss in life expectancy was 1.9 (95% CI: 1.2-2.7) years in the total study population. The estimated loss in life expectancy increased with younger age: 0.4 (95% CI: 0.3-0.5) vs. 4.5 (95% CI: 1.3-7.6) years in patients 80 years and 50 years of age, respectively. There was no difference in loss in life expectancy between men and women.

Conclusions: We found a shorter life expectancy in patients after aortic valve replacement compared to the general population. The estimated loss in life expectancy was substantial and increased with younger age. Our results provide important information to quantify disease burden after aortic valve replacement, and are relevant for clinicians counseling patients before and after aortic valve replacement.

1868-A-1901

Diastolic dysfunction grading with a comprehensive CMR protocol – feasibility and agreement compared to echocardiography

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Background: The assessment of left ventricular diastolic dysfunction (DD) is an integral part of clinical echocardiography. The parameters used to diagnose and grade DD are measures of diastolic velocities in the blood flow across the mitral valve (E and A), diastolic velocities in the myocardium (e'), an estimate of pulmonary arterial pressure, and left atrial volume. Cardiovascular magnetic resonance (CMR) alone does not currently have established methods for measurement of all these measures. We aimed to develop and evaluate the accuracy of a comprehensive CMR DD grading approach compared to echocardiography.

Methods: Consecutive clinically referred patients (n=23, age 53±17 years, 26% female) underwent both echocardiography and CMR (MAGNETOM 1.5T Aera (n=19) or MAGNETOM 3T Skyra (n=4), Siemens Healthcare, Erlangen, Germany). Blood and myocardial velocities were measured during breath hold using a separately validated prototype radial sector-wise golden step (SWIG) phase-contrast through-plane velocity encoded sequence (150-250 frames/second sliding window, 40 ms temporal footprint, velocity encoding 150 cm/s or 30 cm/s). Pulmonary artery pressure was estimated, as previously validated, from 4D flow analysis of pulmonary artery vortex duration using a commercially available time-resolved multiple 2D slice phase contrast three-directional velocity encoded sequence. Left atrial volume was measured using two and four chamber long-axis cine images and the area-length method. Routine transthoracic echocardiography was performed to measure the corresponding conventional echocardiography parameters. The data from both methods were used to perform blinded grading of DD according to the current 2016 recommendations of the American Society of Echocardiography.

Results: Agreement between the two methods was very high (weighted kappa=0.91, $p<0.001$), with a perfect agreement in 17/20 (87%) of cases, where 13% were normal, 9% indeterminate, 48% grade 1 DD, 4% grad 2 DD, and 13% grade 3 DD, see Table 1.

Conclusions: A comprehensive CMR protocol for grading DD encompassing blood and myocardial velocities, estimated pulmonary artery pressure, and left atrial volume is feasible and showed very good agreement with echocardiography.

1869-A-1901

Estimation of mean pulmonary arterial pressure from vortex duration assessed by 4D flow analysis - comparison with tricuspid regurgitant jet velocity from Doppler echocardiography

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Background: Pulmonary hypertension can be diagnosed by right heart catheterization and measurement of mean pulmonary arterial pressure (mPAP). However, systolic pulmonary arterial pressure (sPAP) estimated by echocardiography from tricuspid regurgitant jet velocity (TR) is commonly used in clinical routine. 4D Flow analysis can be used to estimate pulmonary artery pressure from the duration of pulmonary artery vortex duration. We aimed to clinically validate estimated mPAP with 4D Flow analysis compared to estimated sPAP from echocardiography.

Methods: Consecutive clinically referred patients (n=50, age 55±15 years, 42% female) underwent both echocardiography and CMR (MAGNETOM 1.5T Aera (n=43) or MAGNETOM 3T Skyra (n=7), Siemens Healthcare, Erlangen, Germany). mPAP was estimated, as previously validated, from pulmonary artery vortex duration using a commercially available time-resolved multiple 2D slice phase contrast three-directional velocity encoded sequence (20 frames/cardiac cycle, acquisition duration 6-12 minutes). CMR images were analyzed blinded to the results of echocardiography, using prototype 4D flow software (4D Flow, Siemens Healthcare, Erlangen, Germany). Routine transthoracic echocardiography was performed to measure TR and estimate sPAP.

Results: In 40 cases (80%), patients had a normal pulmonary artery pressure by both CMR and echocardiography. Three patients (6%) had an increased pulmonary artery pressure by both CMR and echocardiography. The remaining 7 patients (14%) had an increased estimated pulmonary artery pressure by CMR but not by echocardiography. In cases with both an observable pulmonary artery vortex and measurable TR, sPAP and mPAP were linearly correlated ($R2=0.65$, $p<0.001$).

Conclusions: A 4D Flow analysis method to estimate mPAP from pulmonary artery vortex duration shows good agreement and linear relationship with sPAP estimated with echocardiography.

1870-A-1901

Mean pulmonary arterial pressure from vortex duration assessed by 4D flow analysis – validation using right heart catheterization

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Background: Pulmonary hypertension can be diagnosed by right heart catheterization and invasive measurement of mean pulmonary arterial pressure (mPAP). Cardiovascular magnetic resonance (CMR) 4D flow analysis has been used to estimate pulmonary artery pressure from the duration of pulmonary artery vortex duration (1, 2). We aimed to clinically validate estimated mPAP with CMR 4D flow analysis compared to mPAP measured with right heart catheterization.

Methods: Patients referred to right heart catheterization (n=14, age 64±15 years, 50% female) underwent CMR (MAGNETOM 1.5T Aera, Siemens Healthcare, Erlangen, Germany) 7±8 days after catheterization. mPAP was estimated, as previously validated, from pulmonary artery vortex duration using a commercially available time-resolved multiple 2D slice phase contrast three-directional velocity encoded sequence (20 frames/cardiac cycle, acquisition duration 6-12 minutes). CMR images were analyzed blinded to the results of right heart catheterization, using prototype software (4D Flow, Siemens Healthcare, Erlangen, Germany). Right heart catheterization was performed via the jugular vein with a Swan-Ganz catheter.

Results: mPAP estimated from pulmonary artery vortex duration and mPAP measured invasively were linearly correlated ($R^2=0.91$, $p<0.001$, mean±SD difference 0.1±5.6 mmHg).

Conclusions: 4D flow analysis estimated mPAP from pulmonary artery vortex duration shows excellent agreement with mPAP measured with right heart catheterization. These results provide independent validation from another laboratory of the previously developed method for estimating mPAP using CMR.

1871-A-1901

A new method for the investigation of stable coronary artery disease using acoustic phonocardiography compared to myocardial scintigraphy

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Background: Coronary artery disease (CAD) is one of the most common cardiovascular diseases and one of the dominant causes of death in older people worldwide. Several diagnostic strategies are being used today in order to confirm diagnosis. A Danish company developed the CADScor® system which is intended for investigation of patients with suspected stable CAD in order to be able to exclude the disease with a high probability. The device records intracoronary murmurs, resulting from coronary stenosis, and calculates the patient's risk of CAD. The result is presented in the form of a patient-specific CAD-score, a number between 1 and 99. If CAD-score ≤ 20 the patient's risk for CAD is low. If CAD-score ≥ 21 the patient's risk for CAD is medium or high.

The purpose of this study was to evaluate the method, test CADScor®, compare results with myocardial scintigraphy and calculate the method's sensitivity, specificity and positive and negative predictive value (PPV and NPV).

Methods: 20 patients (men and women, 30-70 years with regular sinus rhythm) which were referred for myocardial scintigraphy. Intracoronary murmurs' recording was performed immediately before myocardial scintigraphy.

Results: After CADScor® examination, 10 patients (50%) received CAD-score ≤ 20 and 10 patients (50%) ≥ 21. Myocardial scintigraphy showed that 15 patients (75%) did not have signs of CAD and 5 patients (25%) had signs of CAD. The sensitivity of the method was calculated to be 80%, specificity 60%, PPV 40% and NPV 90%.

Conclusions: The result means that the probability is 90% that a patient who received a CAD-score ≤ 20 is healthy. It is high enough to use CADScor® in clinical practice for patients with low risk of CAD. CADScor® is a fast, non-invasive and radiation-free method that can be used as a complement in coronary artery disease investigations. Patients with CAD-score ≤ 20 may avoid further examinations, such as myocardial scintigraphy or coronary angiography.

1872-A-1901

What are patients with heart failure willing to pay for an exergame intervention?

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Background:

Exergaming is one low-cost effective physical activity intervention to increase exercise capacity in patients with heart failure (HF). The aim was to describe the willingness to pay (WTP) for an exergame intervention and to determine factors influencing the WTP in HF patients.

Methods:

This is a sub-study of the Swedish cohort of the HF-Wii study (evaluating the effect of exergaming on exercise capacity in HF patients; clinicaltrial.gov NCT01785121). Structured telephone interviews were conducted focusing on WTP for the exergame intervention they received during the study including an exergame platform, an introduction lesson, installation of the exergame computer, and telephone follow-ups, with an estimated cost of ~€440 per patient.

Patients were also asked to rate their level of satisfaction with the intervention on a Numeric Rating Scale (NRS) from 0-10. Information on background variables and income was collected during the interview, while data on six-minute walk test (6MWT) and quality of life was retrieved from the main study.

Results:

29 HF patients participated, mean age 68±9 years, 69% males, mean household disposable income/month of ~€2700 (±1360). Ten patients (34.5%) had a clinically significant effect of the exergaming by improving >30 meters on the 6MWT.

The average WTP was ~€160 (range €0-580). Most patients were satisfied with the exergame intervention and scored 6.5 (±2.6) on the NRS. The satisfaction level was significantly related to WTP (r_s=0.468, p=0.012). Patients with higher satisfaction levels (≥6) were willing to pay more (€210±165) than those with lower satisfaction levels (€60±70), p=0.015. Income, changes in 6MWT, and quality of life showed no significant relationship to WTP.

Conclusions:

WTP varied largely in HF patients despite high satisfaction level with the intervention. The satisfaction level was the only factor influencing patients´ WTP. On average, patients were willing to pay about one-third of the cost of the exergame intervention.

1873-A-1901

Determinants of suboptimal long-term secondary prevention of acute myocardial infarction: The structural interview method and physical examinations

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Background: Secondary prevention after an acute myocardial infarction (AMI) reduces morbidity and mortality, but suboptimal secondary prevention of cardiovascular disease is common. Therefore, the present study aimed to identify potential underlying factors for suboptimal secondary prevention 2 years after an AMI event.

Methods: Patients aged 18-85 years at the time of their index AMI and hospitalized between July 2010 and December 2011, were identified retrospectively and consecutively from hospital discharge records. All patients who agreed to participate underwent a structured interview, physical examinations and laboratory analysis 2 years after their index AMI. Multivariable and univariable logistic regression models were applied to identify independent predictors of different secondary prevention achievements.

Results: Of the 200 patients (mean age 63.3 ± 9.7 years) included in the study, 159 (80%) were men. No common determinants were found in patients who failed to achieve at least six secondary prevention guideline-directed goals. For individual secondary prevention goals, several determinants were defined. Patients born in Sweden were less likely to achieve optimal lipid control [odds ratio (OR) 0.28 (95% confidence interval, CI 0.12-0.63)]. Younger (≤ 65 years) [OR 0.24 (95% CI 0.07-0.74)] and unemployed patients [OR 0.23 (95% CI 0.06-0.82)] were less likely to be non-smokers. Patients with diabetes mellitus [OR 0.21 (95% CI 0.04-0.98)] or with a walking aid [OR 0.23 (95% CI 0.07-0.71)] were less likely to achieve an optimal body mass index (BMI < 25). Living alone was an independent predictor of achieving regular physical activity [OR 1.94 (95% CI 1.02-3.69)].

Conclusion: Long-term secondary prevention remained suboptimal 2 years after an AMI. Causes are likely multifactorial, with no single determinant for all six guideline-recommended preventive goals. Therefore a tailored comprehensive assessment should be requested and updated and treatment of risk factors should be applied.

1874-A-1901

Outcomes in patients with chest pain in the Emergency Department tested with high sensitivity versus conventional troponins

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Background

It is unknown how testing with high-sensitivity troponin (hs-cTnT) compared with conventional troponin (cTn) in the emergency department (ED) is associated with outcomes in chest pain patients.

Methods

In an observational cohort study we included all patients who sought medical attention for chest pain during 2011 to 2016 in the EDs of 13 hospitals in Sweden. The study population was retrieved from each hospitals local registries. Cox regression was used to estimate adjusted hazard ratios (HR) with 95% confidence intervals (CI) for 1-year all-cause mortality, and for potentially missed myocardial infarctions (MI) defined as return to the ED with an MI within 30 days of discharge.

Results

In total, 154,953 patients had a visit for chest pain to hospitals using cTn (82,263 patients) and hs-cTnT (166,661patients), respectively. There were 9,919 (6.4%) deaths during 1 year of follow-up. The adjusted risk of death within 1 year of the visit was 8% lower (HR 0.92, 95% CI 0.88-0.96) in patients in the hs-cTnT group compared with the cTn group. These associations were similar for men and women. In age-adjusted analysis the strongest association was found for patients 80 years of age with an 11% lower risk of death (HR 0.89, 95% CI 0.84-0.94) in the hs-cTnT group. There was an 8% non-significant reduction in missed MIs (HR 0.92, 95% CI 0.69-1.22) in the hs-cTnT group compared with the cTn group.

Conclusions

In a large cohort of patients with chest pain we found that testing with hs-cTnT compared with cTn was associated with a lower risk of death within 1 year of the ED visit. There may be a survival benefit of being tested with hs-cTnT compared with cTn when seeking medical attention for chest pain, a benefit which appears to be most pronounced in the elderly.

1875-A-1901

Electrocardiographic predictors of adverse in-hospital outcomes in the Takotsubo syndrome

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Background: The takotsubo syndrome is a life-threatening acute cardiac condition. However, little is known about risk factors associated with worse outcomes in TS, and no high-risk electrocardiographic criteria have been defined for patients with TS. We sought to identify high-risk admission ECG findings among patients with TS.

Methods: Using the Swedish Angiography and Angioplasty Registry (SCAAR) we identified all cases of TS who were treated at Sahlgrenska University hospital between 2008 and 2017. We reviewed all cases and included patients who met the revised Gothenburg diagnostic criteria. We conducted an in-depth review of all presenting electrocardiograms, using a pre-defined case report form (CRF), including the following variables: heart rate; rhythm; PR-interval; QRS axis; QTc-interval; T-wave inversion.; presence of Q-wave; T-wave axis; and the magnitude of ST-segment deviation in each individual lead. The primary endpoint was the occurrence of in-hospital major adverse cardiac event (MACE), defined as the composite of death, ventricular tachycardia or fibrillation (VT/VF), atrioventricular block ≥2 or asystole > 10 seconds.

Results: We identified 161 patients with TS, of whom 151 (93.8%) were women. The mean age was 69 ± 13 years. MACE occurred in 19 patients (11.8%), and VT/VF occurred in 14 patients (8.7%). No clinical variables were significantly different between patients with and without MACE. Patients with MACE were less likely than those without MACE to have sinus rhythm (79.0% versus 95.8%, p=0.02) or T-wave inversion (15.8% versus 52.8%, p=0.02). T-wave inversion was less common among patients with than without VT/VF (14.3% versus 51.7%, p=0.01). After adjustment for age and sex T-wave inversion was independently associated with lower risk of MACE (Odds ratio 0.13, 95% confidence interval 0.04 to 0.48, p>0.001).

Conclusions: T-wave inversion is common in TS and is associated with lower risk of adverse events, driven by a lower risk of VT/VF.

1876-A-1901

Osteoporosis in relation to chronic kidney disease after heart transplantation: a retrospective single-centre study at Skåne University Hospital in Lund 1988-2016

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BACKGROUND: The present study investigated whether chronic kidney disease (CKD), measured as glomerular filtration rate (GFR) before heart transplantation (HT) predicts development of osteoporosis and loss of bone mineral density (BMD) in the lumbar spine and femoral neck up to 10 years after HT.

METHODS: Patients of ≥ 20 years who underwent HT in Lund 1988-2016 were included in this retrospective single-centre cohort study. Data was collected from clinical records before HT and annually up to 10 years after HT. BMD was measured with Dual Energy X-ray absorptiometry. GFR was measured with iohexol plasma clearance, or when missing calculated with the chronic kidney disease epidemiology collaboration (CKD-EPI) equation.

RESULTS: 169 adult HT patients, 38 female, were included. Mean age at HT was 52 years. Patients with GFR ≥ 60 ml/min/1.73m2 lost significantly more BMD in the lumbar spine during the first 3 years after HT compared to patients with GFR < 60 ml/min/1.73m2 (Fig. 1). No evidence for differences in change in BMD from TA was detected between patients with GFR < or ≥ 60 ml/min/1.73m2 in the femoral neck. In multivariate regression analyses, GFR < 60 ml/min/1.73m2 did not predict osteoporosis in the lumbar spine (HR 0.94; 95 % CI 0.35-2.5; P= 0.90) or femoral neck (HR 1.1; 95 % CI 0.39-3.1; P=0.86), when adjusted for age, body mass index, and gender.

CONCLUSIONS: Surprisingly, a low kidney function prior to HT was associated with less loss of BMD in the lumbar spine, likely as a result of closer monitoring. Moreover, GFR < or ≥ 60 ml/min/1.73m2 before HT was not a predictor of osteoporosis up to 10 years after HT.

1877-A-1901

Gender differences in Patient-reported outcomes and related risk factor due to recurrent atrial fibrillation

Maria Lachonius, Charlotte Widell, Annika Odell

Background: Atrial fibrillation is the most common cardiac arrhythmia and occurs in 3% of an adult population. The presence of atrial fibrillation increases with age and poses a serious risk of stroke.

Purpose: To describe patients' risk profile for stroke and patients' reported outcomes regarding well-being in case of recurrent atrial fibrillation.

Methods: A retrospective register study was conducted with a consecutive sample. The patients, 99 women and 253 men estimated their symptom burden and well-being in a survey.

Results: The women were older then the men, mean age 72 vs 68. The overall range was 38-90 years. 9% of the women vs 37% of the men had a CHA2DS2-VASc score < 2. Hypertension occurred in 54% of the women vs 47% of the men. Earlier stroke or TIA were more common among the women (13%) than among the men (6%). Previous ischemic heart disease was a more frequent risk factor among the men, 16% compared to 8% among the women. 45% of the women and 29% of the men experienced moderate or severe anxiety due to atrial fibrillation. The women felt more severe fatigue compared to the men, 70% vs. 51% and they (51% vs. 34%) experienced greater limitations in everyday life due to the atrial fibrillation. Both women (36%) and men (30%) felt tangible concern for their future health and survival.

Conclusions: Women with recurrent atrial fibrillation are slightly older than men. They are affected negatively to a greater extent than men, but suffering from recurrent atrial fibrillation is a major concern for both men and women regarding their future health. All these findings need to be further analysed to find significant predictors in order to endorse patients' well-being.

1878-A-1901

Transvenous interventional implantation of CRT-D in a critically ill Mustard-patient waiting for heart transplant

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Introduction

Upgrade to cardiac resynchronization therapy (CRT) is indicated in symptomatic chronic heart failure patients with impaired systolic left ventricular function and right ventricular pacing dependency. The role of CRT in hemodynamically unstable patients awaiting heart transplant is unclear and reports of feasibility of CRT in GUCH-patients are scarce. We report on the outcome of transvenous CRT in a critically ill patient Mustard-patient.

Case presentation

Male born 1976 with transposition of the great arteries which was corrected ad modum Mustard at the age of 1 year. Since 2009 chronic atrial tachycardia with normal ventricular rate response. Due to AV-block III in Sept 2017 he received a transvenous implant of a DDD-pacemaker system, which was programmed in VVIR due to failure to restore sinus rhythm after cardioversion. He then spent 5 months in hospital with progressive heart failure and was again transferred to our institution. The patient's condition was to poor for a heart transplant and he was listed for CRT-D upgrade in March 2018. Transvenous implantation of an ICD lead to the septum of the subpulmonary ventricle and extraction of redundant atrial och ventricular pacemaker leads was uneventful. Subsequent puncture and dilatation entering the systemic atrium aided by intracardiac echocardiography to facilitate placement of a lead in the systemic ventricle was successful. QRS narrowed from 235 to 160 ms and cardiac index improved from 1.8 to 3.2 l/min/BSA, which translated into a more stable clinical situation. The patient was received a transplant three months later and is now doing very well.

Conclusion

Upgrade to CRT may alleviate symptoms of severe heart failure and reduce the need of inotropic agents and hospitalization in selected patients with advanced heart failure awaiting heart transplant. Interventional techniques and peroperative imaging make transvenous CRT-D implant feasible in patients corrected ad modum Mustard.

1879-A-1901

Evaluation of creatinine based methods for estimating glomerular filtration rate in heart failure

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Background

Glomerular filtration rate (GFR) is an important factor in management of heart failure. 51CrEDTA based clearance is a method for exact measure of GFR (mGFR). The aim of this study was to validate creatinine-based equations for renal function against 51CrEDTA based clearance in a heart failure population.

Methods

All patients diagnosed with heart failure who underwent 51CrEDTA between 2010-2018 were included. eGFR were estimated using Cockcroft-Gaults ideal and actual weight (CGIW and CGAW), The Modification of Diet in Renal Disease Study (MDRD), simplified MDRD (sMDRD), The Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI), Lund-Malmö (LM-rev), Full Age Spectrum (FAS) and the Berlin Initiative Study 1 (BIS1). Pearson's correlation and Bland-Altman plots (B&A) were performed. The accuracy was defined as the percentage of patients whose eGFR was within +30% of mGFR.

Results

146 patients were included (age 68 +13 years, LVEF 40 % n=53 (36 %)). Mean mGFR were 42 ml/min/1,73 m2 and mean eGFR for all equations were eGFR 30-59 ml/min/1,73m2 except for MDRD with a mean eGFR of 28 ml/min/1,73 m2 due to urea only available for renal failure patients. Pearson's correlation coefficient (r) were highest for MDRD (r=0.9), followed by LM-rev (r=0.88) and lowest for CGAW (r=0.81). MDRD had lowest bias (-4,8) followed by LM-rev (17,7). CGAW (29,8) and sMDRD (31,9) had highest bias. Accuracy were above 75 % only for MDRD (80%), followed by LM-rev (68 %) and lowest for CGAw and sMDRD (46%).

Conclusions

LM-rev showed the lowest bias and highest precision and accuracy in estimating GFR in our population with chronic heart failure. In patients with renal impairment and heart failure, MDRD was the most accurate method. The most common method, Cockroft-Gault, had the lowest correlation and overestimates renal function the most.

1887-A-1901

Correlation between N-terminal probrain natriuretic peptide before and heart rhythm after outpatient electrical cardioversion

Samira Rezaei, Johan Engdahl

Background

Atrial fibrillation (AF) is the most common clinical arrhythmia and affects 3% of adults in Sweden. It is associated with increased risk of death, stroke and heart failure.

Electrical cardioversion is an effective way of breaking arrhythmia when patients have significant symptoms but the risk of relapse is high.

The relationship between NT-proBNP (the inactive part of the prohormone ProBNP which is secreted from myocardial cells) and AF is known in the past where it has been seen that NT-proBNP levels in patients with AF have been increased via the secretion of proBNP from the atria, so NT-proBNP may be a biomarker for AF recurrence but the role of NT-proBNP levels in relation to the recurrence risk for AF after electrical cardioversion is unknown.

Method

Through a prospective study, we called in patients without heart failure, kidney failure or antiarrhythmic treatment who had undergone outpatient cardioversion between June 2015 and March 2018 at the Department of medicine, Halland Hospital Halmstad after 6 months. NT-proBNP was analyzed 1-2 days before cardioversion and also at follow up

six month after cardioversion. Heart rate and rhythm were determined by ECG.

Results

48 patients participated in the study (17% women) with mean age 72 + 7.2 and CHA2DS2VASc Score (thromboembolic risk estimate) 3 + 1. 33 of the patients (69%) had maintained SR for 6 months after electricity conversion. The difference between the level of NT-proBNP before electrical cardioversion between those with retained sinus rhythm and those with AF recurrence after 6 months was not statistically significant but NT-proBNP levels were significantly lower among patients with sinus rhythm after 6 months.

Conclusion

NT-proBNP prior to outpatient electrical cardioversion did not predict relapse to atrial fibrillation after 6 months.

1888-A-1901

Instant analysis of the ECG with a new digital technique during palpitations reduce symptoms, anxiety, depression, and increase HRQOL in women (Red Heart Study)

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Background: Palpitation is common, particularly in women, and usually benign caused by premature atrial/ventricular beats or stress-induced sinus tachycardia. Palpitations may cause disturbing symptoms, anxiety, depression, and decreased health related quality of life (HRQOL). Uncommonly, arrhythmias of clinical importance such as atrial fibrillation or paroxysmal supraventricular or ventricular tachycardia may be the cause

Aim: To evaluate if instant analysis of underlying heart rhythm during palpitations reduce symptoms, anxiety, depression, and increase HRQOL.

Method: In all, 918 women (age 56±11 years) with palpitations causing anxiety were recruited from social web sites. Coala Heart Monitor® was used by participants and ECG recorded twice a day and at symptoms for 60 days. The system uses a well-validated algorithm to analyze heart rhythm, is connected to the user´s smartphone and provides immediate response to the user. In cases of non-benign arrhythmias, the result was also analyzed manually. Questionnaires addressing symptom (Symptom severity and frequency checklist, SCL), anxiety, depression (Hospital anxiety and depression scale, HADS, Generalized Anxiety Disorder, GAD -7) and HRQOL (RAND-36) were analyzed before and after two months. Exclusion criterium was known atrial fibrillation.

Results: Between June 2018 - November 2018, 280 474 recordings (both chest and thumbs) ECG recordings were automatically analyzed. Frequency and severity of symptoms decreased (frequency 23.7±8 to 19.8 ±9 ($p<0.001$), severity 22.6±5 to 21±4 ($p<0.001$)). Anxiety and depression (HADS and GAD-7) decreased ($p<0.001$) and HRQOL increased in all domains ($p<0.001$). In 83% of recordings during symptomatic palpitation, benign premature atrial or ventricular beats, sinus tachycardia, or normal sinus rhythm were found.

Conclusion: Instant analysis of the ECG with direct response during palpitations reduce symptoms, anxiety, depression, and increase HRQOL in women.

1890-A-1901

Very rapid inclusion in a clinical study via social media with the help of bank-ID: A study on 918 women with palpitations using new digital techniques.

Karin Schenck-Gustafsson, Carina Carnlöf, Brjann Ljotsson, Per Insulander

Background

A new Swedish heart monitor was used to explore if instant analysis of ECG during palpitations can reduce symptoms and increase quality of life evaluated with web-based questionnaires.

Aim

Inclusion rate and implementation are very long for clinical or real-world studies. We wanted to test if a web-based method for inclusion and study implementation would be more efficient.

Method

With the help of the NGO 1.6 million club during its yearly women´s heart campaign and via the press and social media, information of the study was spread nationally. We were offered via Karolinska Institutet to use solely digital tools for study inclusion and implementation. Personal Bank-ID was used when confirming ID and when signing informed consent, patient information and web-based questionnaires. In Sweden, it is estimated that 80% of the adult population use Bank ID. ECG was regularly recorded for two months. Questionnaires were administered before and after.

Results

During initial two weeks, over 1000 women submitted their interest to participate. Totally, 2387 women wanted to participate. Of these, the first 1132 were invited (we aimed at 1000 persons) and finally 1111 were included. Study start was June 8 and study end Nov 30, 2018. A total of 918 women (age 56+/- 11) completed the study. Reasons for drop-out were registered. The ECG analyses were automatically performed with a well-validated algorithm with immediate response. In total, 280474 recordings (both chest and thumbs) were performed. Participants had no problems with the digital approach in this totally web-based study and they were satisfied with the procedures.

Conclusion

To speed up the inclusion rate, a totally web-based method including web-based Bank-ID was successfully used for the first time in a clinical study. Both study participants and those running the study were very content with the method.

1891-A-1901

Is echocardiography a useful tool for identification of cardiovascular dysfunction in patients with ankylosing spondylitis?

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Background:

The European League Against Rheumatism recognises cardiovascular disease (CVD) as a significant co-morbidity for patients with ankylosing spondylitis (AnkS). Current methods for identifying AnkS patients with an increased risk of CVD are limited. Our aim was to investigate cardiac involvement in patients with AnkS using echocardiography and 2D strain.

Methods:

Comprehensive echocardiographic studies were carried out on 27 patients with AnkS and 27 age and sex-matched controls. All participants were current non-smokers, non-diabetic, not currently diagnosed or being treated for hypertension, had no signs of heart failure and had no history of cardiac events or surgery (no pacemaker, bypass, stroke or myocardial infarction). Controls had no history of rheumatic disease. Standard echocardiographic parameters were measured, including left ventricular ejection fraction (LVEF), diastolic variables, chamber volumes and dimensions, and outflow track velocities. Biplane left ventricular (LV) global longitudinal 2D strain (GLS) was also measured.

Results:

LV end-diastolic diameter and LVEF were within normal range for both patients and controls, however, patients had significantly lower values than controls. Patients had significantly lower biplane LV 2D GLS than controls. Patients mitral valve inflow deceleration time (MV DT) was significantly longer, septal e' significantly lower and E/e' ratio significantly higher than in controls.

Conclusion:

Echocardiography shows potential as a useful tool to identify and monitor subclinical cardiovascular changes in patients with AnkS. Although the majority of the results were within the normal range for the age of the AnkS patients, some results were significantly different from controls, suggesting a trend towards the development of systolic and diastolic dysfunction. Longitudinal studies with more subjects are required to further assess the usefulness of this technique in patients with AnkS.

1892-A-1901

The NAILED ACS Trial – Telephone-based long-term follow-up reduces risk factors after 36 months

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Background: Cardiovascular secondary preventive strategies need improvement. The proportion of patients reaching guideline recommended treatment targets are low. We investigated if nurse-led, telephone-based follow-up including medical titration was superior to usual care in controlling blood pressure (BP) and low-density lipoprotein cholesterol (LDL-C) levels 36 months after an acute coronary syndrome (ACS).

Methods: All patients admitted with ACS at Östersund hospital between 1st January 2010 and 31st December 2014 were screened for inclusion based on their ability to participate in a telephone-based follow-up. Participants were randomized into two parallel groups, an intervention group and a control group receiving usual care. BP and LDL-C were measured at one month, 12, 24 and 36 months. The intervention group received counseling and medical titration to attain treatment targets of BP (<140/<90 mmHG) and LDL-C (<2.5/<1.8 mmol/L). The primary outcome was LDL-C at 36 months.

Results: Out of 962 randomized patients, 797 were available for analysis after 36 months. In the intervention group, mean systolic blood pressure (SBP) was 4.1 mmHg lower (95% CI 1.7 - 6.4, p =0.001), diastolic blood pressure (DBP) was 2.8 mmHg lower (95% CI 1.4- 4.4, p <0.001) and mean LDL-C was 0.26 mmol/L lower (95% CI 0.12 - 0.4, p <0.001) when compared to the control group. The proportion of patients reaching treatment target goals was also significantly higher in the intervention group.

Conclusions: After 36 months of follow-up the nurse-led, telephone-based intervention led to significantly lower systolic blood pressure, diastolic blood pressure and LDL-C levels when compared to the control group. The intervention group also had a larger proportion of patients reaching target values.

1893-A-1901

Longitudinal ventricular function to determine the effect of cardiac resynchronization therapy in patients with heart failure

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Background: Cardiac resynchronization therapy (CRT) restores ventricular synchrony and induce left ventricular (LV) reverse remodeling in heart failure patients with decreased ejection fraction and prolonged QRS-duration. However, 30% of treated patients are objective non-responders. Cardiac magnetic resonance imaging (CMR) can be used to quantify regional contributions to stroke volume (SV) as potential CRT predictors. Septal contribution to SV has been shown to be lower in patients with heart failure compared to healthy volunteers, with similar longitudinal contribution. These new measures may be influenced by dyssynchrony and hence improve selection of patients for CRT. The aim of this study was to quantify LV longitudinal and septal contribution to SV (SVlong% and SVsept%) and test the hypothesis that these parameters could predict treatment effects in patients undergoing CRT.

Methods: Fifty-four patients eligible for CRT (18 women; 68 ± 8 [mean ± SD] years) underwent CMR. SVlong% and SVsept% were compared to outcome measures. Outcome was assessed as LV reverse remodeling, defined as reduced LV end-systolic volume (LVESV) measured by echocardiography. CMR measures were compared with 20 age and sex matched healthy controls.

Results: SVsept% was lower in patients compared to controls (-1 ± 15% vs 10 ± 4%, $p<0.01$) and atrioventricular plane displacement was lower in patients compared to controls (8 ± 3 mm vs 15 ± 2 mm, $p<0.01$). LVESV was decreased at follow-up compared to baseline (154 ± 61 ml vs 123 ± 45 ml, $p<0.01$). There were no differences in SVlong% nor SVsept% between responders and non-responders (Table 1).

Conclusions: Quantitative assessment of septal movement showed almost half of the patients eligible for CRT had a septal shift towards the right ventricle during systole. However, LV reverse remodeling did not relate to pre-operative septal motion to the left or right or to longitudinal contribution to SV.

1894-A-1901

Same-day CMR and pre-operative predictive simulation of Fontan pulmonary blood flow

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Background

Children born with severe heart malformations are sometimes converted to a Fontan circulation with a total cavo pulmonary connection (TCPC). The pulmonary blood flow distribution is however hard to predict and may require post-surgical invasive interventions. Pulmonary blood flow can be predicted using patient-specific computational fluid dynamic (CFD) simulations based on CMR imaging. This is however a resource intensive process with the patient in anesthesia during CMR, and CFD simulations performed by engineers at other locations.

We aim to provide a clinically integrated in-center process for performing CMR under mild sedation, without anesthesia or contrast agent and deliver an accurate CMR-based predictive pre-surgical simulation, both on the same day before surgery.

Methods

Two patients (3years old, 14 and 12kg) planned for TCPC surgery were prospectively included. The patients were mildly sedated with Dexmedetomidine, enabling a maximum CMR-time of <60 minutes. Contrast-free CMR acquisition of anatomy (SSFP) and phase-contrast (PC) data was used to build a patient-specific CFD model. The model was modified to represent the TCPC surgery, and pre- and post-surgical pulmonary flow was calculated.

Results

Simulations of the pre-surgical left/right pulmonary blood distribution (Figure A) were 48/52% and 32/68% and PC flow 48/52% and 39/61% respectively. CMR data processing and performing all simulations, including of the post-surgical TCPC (Figure B), could be completed in-center within 4-5 hours after the CMR examination, including provisioning for overnight 3D-printing. All results were ready at the pre-surgical conference the next morning.

Conclusions

We have demonstrated that a same-day CMR and pre-operative predictive simulation of Fontan pulmonary blood flow can be achieved in-center, without anesthesia or contrast agent required during the CMR acquisition. This shows how CMR in combination with computational modelling can be implemented in clinical routine for improving surgical planning without extensive resources.

1895-A-1901

Performance evaluation of dual vs. single lead automatic, real-world arrhythmic ECG recordings

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Background: Detection of treatment-demanding paroxysmal arrhythmias can be difficult. Use of single lead ECG recordings for detection of Atrial Fibrillation (AF) has shown to lead to high false positive discovery rates, and requirements of additional manual clinical interpretation or 12-lead ECG to reach satisfactory diagnostic precision. Use of sequential, dual-lead ECG recordings for detection of AF has indicated significant clinical improvement in detection yield of AF and reduction of false positive discovery rates as compared to single lead-ECG.

Methods: The Coala Heart Monitor ("Coala", Coala Life AB, Stockholm Sweden) system was evaluated by manual interpretation of 1,000 consecutive anonymous printouts of chest- and thumb-ECG waveforms, without any exclusion. The anonymized printouts contained three 10 s. strips of ECG at 25 mm/s, including mean heart rate, RR median and any user-provided annotation but with personal identification and algorithm analysis results removed (blinded), apart from gender and age within a 10-year span. The recordings were derived from actual Coala users in Sweden with no training, control or influence, under a defined time period. The prevalence of cardiac conditions in the user population was unknown.

The blinded recordings were manually interpreted by a trained cardiologist. The interpretation was compared with the automatic analysis performed by an enhanced algorithm in the Coala Cloud to evaluate ECG signal performance and to calculate performance metrics of a combination of sequential dual chest- and thumb-ECG measurements as compared to the clinical performance metrics of singe lead ECG measurements only.

Results: The false positive discovery rate decreased from 35,3% based on single lead thumb-ECG only, to 12,8% using a dual chest- and thumb-ECG and P-wave detection algorithm.

Conclusion: Based on 1,000 real-world recordings the sequential combination of dual chest- and thumb-ECG with P-wave detection yielded significantly higher Positive Predictive Values (PPV) as compared to single lead ECG measurements. Dual chest- and thumb-ECG reduced false positive AF indications from 35,3% for single lead-ECG to 12,8% using combined chest- and thumb-ECG with P-wave detection.

1896-A-1901

Sacubitril/Valsartan in clinical practice, how does it work?

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Background

Sacubitril/Valsartan (Sac/Val) was introduced in 2016 in Sweden. However, how does it work? This study was aimed to investigate eligibility, titration and tolerability for Sac/Val in a real-world clinical setting.

Methods

This retrospective cohort study consisted of two parts; part 1 (eligibility study): consecutive inclusion of all patients discharged from Sahlgrenska University Hospital due to heart failure (HF) during 2016-11-01 and 2017-10-31. Patients are judged to be eligible based on ESC or Swedish criteria; part 2 (tolerability study): patients received Sac/Val during the same study period. Data regarding initial dose, up-titration, adverse events, hospitalisation and mortality during follow-up (from 6 months to one year) were collected.

Results

During one year, 1355 patients (mean age 78±13 yrs) were hospitalized due to HF. Among them, 562 patients had EF ≤40% in which 10.9% of the patients were eligible for initiation of Sac/Val based on ESC criteria, and additional 15.9% were eligible according to Swedish recommendations. During the same period, 96 patients (mean age 66±12 yrs) were initiated with Sac/Val, 18 % discontinued, 15.6% developed S-K≥5.5 mmol/L, 13.5% S-creatinine>221 µmol/L and 7.3% hypotension. During follow-up 24.0% were readmitted for HF and 13.8% died (fig1). Logistic regression analysis showed lower starting dose, renal disease and higher NTpro-BNP level as predictors for worsening of renal function and higher number of comorbidities as predictors for readmission due to HF. Analysis also showed renal disease as predictor for hypotension and further, high age, elevated NTpro-BNP and more comorbidities as predictors for death.

Conclusions

In our consecutive hospital HF cohort, 26.8% of patients with reduced EF were eligible for Sac/Val. Those who received Sac/Val were younger. Side effects and discontinuation rates were comparable to those observed in PARADIGM except a higher percentage of hypotension, worsening of renal function and HF readmission.

1898-A-1901

Test-retest reliability, agreement and the minimal detectable change in the six-minute walk test in patients with intermittent claudication

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Background

Standardized walk tests are important for objective assessment of walking distance in patients with intermittent claudication (IC). The six-minute walk test (6MWT) has been suggested to correlate more closely to everyday ambulatory function than treadmill testing, but its measurement properties have hardly been studied in IC. The aim was to determine the test-retest reliability, agreement, standard error of measurement (SEM), and the minimal detectable change (MDC) of the 6MWT in patients with IC.

Methods

A total of 100 patients with IC (mean age 72 ± 7.4 years; 43 women) were recruited from the vascular surgery outpatient clinic at Sahlgrenska University Hospital. The patients performed the 6MWT twice, with at least 30 min of rest between tests. To determine test-retest reliability, the intra-class correlation coefficient (ICC) was calculated. Bland-Altman plots were used to measure agreement.

Results

The mean walking distance in both test and retest was 397.8m (SD 81.2m) (n=100) and the individual walking distance varied from 175–600m. Excellent test-retest reliability for the 6MWT (the ICC 0.95, 95% CI 0.94–0.97) was observed. The SEM was 16.6m (95% CI 14.6–19.3), the SEM% was 4.2%, and the MDC was 46m. Five observations (5%) were positioned outside the limits of agreement, there was a small proportional bias, and the scatter of values for differences decreased as the average values increased.

Conclusions

The excellent test-retest reliability implies that it is sufficient for patients with IC to perform the 6MWT once, at every test occasion. For the individual, an improvement or deterioration, in maximum walking distance of >46m after an intervention would be required to be 95% confident that the change is significant. Being a simple and clinically useful test, the 6MWT can be widely used to evaluate the effects of different interventions in patients with IC.

1899-A-1901

Persons with dilated aorta ascendens – who are they?

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Background

Dilation of the ascending aorta (AscA) may result in life-threatening events. However, it often remains asymptomatic and undiagnosed until the catastrophic complication occurs. The prevalence of dilated AscA is largely unknown. It is also unclear whether traditional cardiovascular risk factors are associated with dilated AscA.

The aim was to study the prevalence of dilated AscA and its possible association with cardiovascular risk factors in a middle-aged population.

Methods

Five thousand subjects from the Swedish CardioPulmonary BioImage Study (SCAPIS), aged 50-65 years, underwent transthoracic echocardiography (echo) and coronary CT angiography. Subjects with dilated AscA (diameter ≥ 40 mm) were identified. Two age- and gender-matched controls with normal AscA diameter were selected per case. Presence of carotid artery plaques was determined by duplex ultrasound.

Results

Seventy cases (16 women, 54 men) and 135 controls were included. In cases, echo and CT measurements were 42 (41-43) and 42 (41-45) mm, respectively. Body surface area-adjusted AscA diameters were higher in female than in male cases, 23 (22-24) vs 20 (19-21) mm/m² ($p<0.001$), see Figure. Bicuspid aortic valves were more common in cases than in controls (12 % vs 0 %). The use of antihypertensive drugs was higher among cases, 47 % vs 33 %, $p=0.04$. There were no differences in body size, smoking status, diabetes, history of cardiovascular disease or presence of carotid plaques between cases and controls.

Conclusions

The prevalence of dilated AscA was 1.4 % in a Swedish middle-aged population. Dilated AscA was associated with male sex, aortic valve pathology and antihypertensive medication. Whether dilated AscA is associated with impaired regulation of blood pressure and vascular function deserves further investigation. Also, data raise the intriguing question that a 40 mm cut-off value may not be appropriate for the diagnosis in women.

1902-A-1901

Mitral and tricuspid atrioventricular plane displacement measurements by cardiac magnetic resonance and M-mode echocardiography are reproducible but cannot be used interchangeably

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BACKGROUND: Longitudinal function is the main contributor to stroke volume. It can be assessed by echocardiography by measuring the mitral annular plane systolic excursion (MAPSE) and tricuspid annular plane systolic excursion (TAPSE). Whereas mitral and tricuspid plane displacement measurements by CMR have previously been performed manually, recent semi-automatic methods have simplified assessment. Potential differences in measurements and method variability between echocardiography and CMR have not been presented for a young adult population. The aim of this study was to compare MAPSE and TAPSE by echocardiography and CMR and to provide reproducibility data for AV-plane displacement for systolic longitudinal function in a young adult population.

METHODS: This cross-sectional study included 157 adults (25–41 years). M-mode echocardiography and 4-chamber cine bSSFP CMR were performed for MAPSE and TAPSE measurements. The maximum M-mode distance according to clinical routine and semi-automated dedicated software for CMR data was used. Method comparisons were assessed with Deming regression and Bland-Altman analysis. Intra- and interobserver reproducibility was assessed by concordance correlation coefficient (CCC) and Bland-Altman analyses.

RESULTS: For MAPSE, echocardiography demonstrated higher values than CMR (18±3 mm vs 17±3mm; p=0.04). For TAPSE, echocardiography demonstrated lower values than CMR (25±3mm vs 27±4mm; p<0.001). MAPSE demonstrated a higher correlation between echocardiography and CMR (fitted-slope 0.8) and lower bias (0.56) than TAPSE (fitted-slope 0.55, bias -1.55) (Table 1). Both echocardiography and CMR demonstrated high intra- and interobserver reproducibility (Table 2).

CONCLUSIONS: Echocardiography and CMR are not interchangeable for measurements of MAPSE and TAPSE. This may in part be explained by different temporal resolution in echocardiography and CMR, and how exact the 4-chamber view was acquired by echocardiography. However, as reproducibility of both echocardiography and CMR, respectively, for assessment of left and right annular displacement is high, both methods are clinically useful for these measurements although they cannot be used interchangeably.

1903-A-1901

Eosinophilic myocarditis and the importance of endomyocardial biopsy

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Introduction:

Eosinophilic myocarditis is an acute life-threatening inflammatory disease of the heart which is probably under-diagnosed and often discovered on post-mortem examination (1) . Uncertainty remains regarding signs and symptoms at presentation, clinical course and outcome (2).

Case presentation:

A 63 year old male presented with chest pain, shortness of breath and atrial fibrillation. He had been on holiday and had developed a fever. During the flight home he had an episode of syncope and was taken straight to the hospital from the airport. Previous history of hypertension, hyperlipidaemia and spinal stenosis.

At admission he had fast atrial fibrillation, new onset RBBB, dyspnoea and a systolic BP of 80 mmHg. A CT scan ruled out pulmonary embolism. Laboratory findings showed TnT 400 and CRP 76. Coronary angiogram was normal. Echocardiography revealed left ventricular hypertrophy and some pericardial effusion. The patient continued to have intermittent chest pain, fever and elevated TnT. Myocarditis and/or amyloidosis was suspected and a cardiac MRI was performed. The MRI showed areas with diffuse fibrosis but no signs of perimyocarditis. The patient had slightly elevated eosinophils. The preliminary diagnosis at this point was amyloidosis based on presentation (conduction disturbances), medical history (spinal stenosis and a suspicion of neuropathy). Also QRS-amplitudes on ECG had decreased markedly compared to a few years before despite the findings of left ventricular hypertrophy on Echo.

To confirm the diagnosis an endomyocardial biopsy was performed and the result showed eosinophilic myocarditis. The patient was started on 60 mg Prednisone daily and was then discharged to rheumatology for further investigations.

Conclusions:

This is a presentation of a quite rare myocardial disease where the right diagnosis was only confirmed with the help of endomyocardial biopsy. Our case highlights the importance of endomyocardial biopsy in clinical practice.

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1904-A-1901

Cardiac anxiety in patients with Myocardial infarction and validation of Cardiac Anxiety Questionnaire

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Background: Cardiac-related anxiety after myocardial infarction (MI) is common and a potential health obstacle. This is especially true for cardiac-related anxiety. Little is known about clinical and demographic factors relating to the level of cardiac anxiety. The purpose of this study is to explore the clinical and demografic factors relating to the level of cardiac anxiety in patients wth myocardial infarction and to perform psychocometry of the Cardiac anxiety questionnaire (CAQ).

Methods: Based on a cross-sectional study on familial hypercholesterolemia, 96 post MI-patients rated their cardiac anxiety on the Cardiac Anxiety Questionnaire (CAQ)on one occassion. Clinical and demographic data were collected at the same time.

Results: Longer time since last cardiac event was associated with less cardiac anxiety. Younger age, recurrent events, recency of event and older age at first event is related to higher levels of fear of cardiac symptoms and disease. Older age and younger age at first MI was associated with higher levels of avoidance of situations triggering cardiac fear. The Cronbach´s alpha was 0.89 for CAQ.

Conclusion: Cardiac anxiety differs with respect to demographic and clinical caracteristics in post-MIpatients. This may have an impact on cardiac rehabilitation. This study was small and the findings are largely explorativeand therefore need to be confirmed in larger and better controlled studies. The results suggest that cardiac anxiety after MI is related to factors such as time since the event.

1905-A-1901

Symptomatic palpitations causing anxiety in women – what are the underlying arrhythmias?

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Background: Highly symptomatic palpitations are common, particularly in women, and may cause disturbing symptoms including anxiety, depression, and decreased health related quality of life. Palpitation in this context has been considered generally benign and caused by premature atrial or ventricular beats or stress-induced sinus tachycardia. However, how often arrhythmias of clinical importance such as atrial fibrillation and supraventricular or ventricular tachycardia is the cause is unknown.

Aim: To evaluate to what extent symptomatic palpitation in women is caused by clinically important arrhythmias.

Method: A new Swedish digital technique (Coala Heart Monitor®) was used. The system uses a well-validated algorithm to analyze heart rhythm (both thumbs and chest recordings), is connected to the user´s smartphone and provides immediate response to the user. The result is simultaneously available for the supervising physician. In cases of non-benign arrhythmias, the result was also analyzed manually. In all, 918 women (age 56±11 years) with palpitations causing anxiety were included. ECG was recorded twice a day and at symptoms for 60 days. Participants with known atrial fibrillation were excluded.

Result: In all, 6 831 ECG recordings were done due to symptomatic palpitation. Underlying heart rhythms were as follows: normal sinus rhythm (73%), sinus tachycardia (12%), premature atrial or ventricular beats (7%), atrial fibrillation (4%), benign sinus bradycardia and second-degree AV block type 1 (4%), supraventricular tachycardia (1%). In 1% of recordings, quality was too poor for analysis. No ventricular tachycardia was recorded.

Conclusion: In the great majority of episodes causing symptomatic palpitation in women, the underlying arrhythmia is benign. However, in 5% previously undiagnosed atrial fibrillation or supraventricular tachycardia were found.

1906-A-1901

Surgery is underused in elderly patients with infective endocarditis: a nationwide registry study

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Background

Infective endocarditis (IE) is associated with higher mortality in elderly patients but the role of surgery in this group is not fully evaluated. The aim of this study was to assess short-term and long-term outcomes of elderly patients with IE and to determine the influence of surgery on mortality in the elderly.

Methods

A nationwide retrospective study using the Swedish Registry on Infective Endocarditis on 2260 episodes of IE divided into <65 years (n=907), 65-79 years (n=829), and >80 years (n=524). Follow-up on survival was performed using the Swedish National Population Registry. Propensity score matched analysis was used to assess the effect of surgery on survival in elderly patients. Long-term survival was estimated with the Kaplan-Meier method.

Results

The proportion of patients who underwent surgery decreased with increasing age from 47% in patients aged <65 years to 6% in patients aged >80 years. In-hospital mortality was 3 times higher in the >80-years-group compared to the <65-years-group (23% and 7%, respectively) and almost 2 times that of patients aged 65-79 years (13%). In the matched groups, in-hospital mortality in operated patients was 19% compared to 25% in non-operated patients (p=0.36). One-year survival was 49.9% (95% CI 39.8 -60.0%) in non-operated patients compared to 70.4% (95% CI 60.8-80.0%) in operated ones (log rank p=0.003).

Conclusions

In this large cohort of patients with IE, the proportion of elderly patients with IE who are operated is very low compared to that of younger patients. In matched elderly patients, 1-year mortality was higher in non-operated patients, suggesting that surgery might be underused in elderly patients.

1907-A-1901

Increased pulmonary blood volume variation in patients with heart failure compared to healthy controls; a non-invasive, quantitative measure of heart failure

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Background: The pulmonary blood volume variation (PBVV) quantifies how blood within the pulmonary vascular bed varies over a heart cycle, as measured by magnetic resonance imaging (MRI). However, PBVV has never been quantified in the clinical setting of heart failure (HF). The aim of this study was therefore to evaluate if PBVV in HF patients differ from healthy controls. We hypothesized that patients with HF have lower PBVV compared to healthy controls and that PBVV therefore could serve as a potential non-invasive quantitative measure of HF.

Methods: Forty-eight patients with HF (NYHA class I-IV) and ten age and gender-matched healthy controls underwent cardiac MRI at 1.5T. The PBVV was calculated from blood flow measurements in the pulmonary trunk and in one pulmonary vein. The PBVV was defined as the maximum difference in cumulative pulmonary blood volume over one heartbeat (Figure 1). PBVV was normalized to stroke volume (SV) in the pulmonary trunk (PBVVsv).

Results: Patients with HF (EF 33±13%) displayed significantly higher PBVVsv than healthy controls (60±20% vs 43±7%, p=0.001, Figure 2). There was a stronger correlation between PBVVsv and right ventricular ejection fraction (EF) (R=-0.57, p<0.001), compared to PBVVsv and left ventricular EF (R=-0.37, p=0.01). The PBVVsv was higher in patients with NYHA class III-IV (n=12) compared to patients with NYHA class I-II (n=26), (72±27% vs 56±15%, p=0.04). In eight out of 48 patients, a systolic notch was seen in the pulmonary trunk flow profile, as a sign of pulmonary hypertension. Patients with a systolic notch had significantly higher PBVVsv compared to patients without systolic notch (75±22% vs 58±18%, p=0.01).

Conclusions: In contrast to our hypothesis, PBVVsv is increased in patients with HF compared to healthy controls and is therefore a possible quantitative non-invasive measure of backward failure in HF. The potential prognostic implications need to be investigated.

1910-A-1901

Diagnosing Type 2 Myocardial Infarction in Clinical Routine. A Validation Study.

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Background

Since 2010, all myocardial infarction (MI) patients reported to the Swedish registry for MI (SWEDEHEART) are routinely classified into MI subtypes. The registry has been used to study the type 2 MI population but the MI-classification in the registry has not previously been validated. The aim of this study was to validate the type 2 MI classification in the registry.

Methods

A total of 772 patients diagnosed with MI in 2011 and reported to the SWEDEHEART registry were included in the study. All patients were retrospectively classified into MI type 1-5 or myocardial injury by independent reviewers strictly adhering to The Third Universal Definition of MI. This gold standard classification was compared with the classification in the registry.

Results

The MI diagnosis was confirmed in 728 (94.3%) of the cases. A type 1 MI diagnosis was confirmed in 523 out of 609 cases in the registry (PPV 85.9%; 95%CI 82.9-88.5). Forty-eight (6.2%) patients were classified as type 2 MI in the registry compared with 93 (12.0%) according to the gold standard classification. A type 2 MI diagnosis was confirmed in 30 out of the 48 type 2 MI patients in the registry (PPV: 62.5%; 95%CI 47.3 - 76.0). There was a moderate rate of agreement (κ: 0.43) between the gold standard classification and the classification in SWEDEHEART in deciding a type 2 MI diagnosis.

Conclusions

The PPV of a type 2 MI classification in SWEDEHEART was 62.5% and the registry agreed moderately with the gold standard classification in deciding a type 2 MI diagnosis. Studies on the type 2 MI population in the registry should be interpreted with caution. Since the prevalence of type 2 MI is substantially underestimated in SWEDEHEART, the registry should not be used to study the prevalence of this MI type.

1911-A-1901

Enablers and barriers for physical activity in adults with congenital heart disease

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Background: A majority of adults with congenital heart disease (CHD) have reduced exercise capacity and do not reach the recommended level of physical activity. A physically active lifestyle is essential to maintain health and counteract acquired cardiovascular disease. This study illuminates aspects that may be relevant for performing physical activity.

Aim: To describe what adults with CHD considered as enablers and barriers for physical activity.

Methods: Semi-structured interviews were performed individually with fourteen adults (age 19-68 years, women=7) with complex CHD. The interviews were analyzed using qualitative content analysis.

Results: Aspects that may enable or inhibit physical activity were found in four categories: Physical, psychological, psychosocial and environmental aspects (figure 1)

This can be exemplified by the category physical aspects; where persons expressed being limited by the CHD to perform physical activity, but also that improved aerobic fitness allows for being more active, and in the category psychosocial aspects; the person's previous negative experiences and lack of support constituted barriers while encouragement from others and being active as a child enabled an active lifestyle in adult age.

Conclusion: The present study identifies barriers and enablers for being physically active in adults living with CHD. It is essential to identify prerequisites for supporting and promoting physical activity and thereby hopefully prevent long-term adverse outcomes. Barriers can potentially be transformed to enablers through increased knowledge in both the adult with CHD and the healthcare provider.

1912-A-1901

Left ventricular longitudinal contribution to stroke volume in pregnancy complicated by preeclampsia and normal pregnancy compared to non-pregnant controls

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Background: During early pregnancy cardiac output increases by up to 45%, exposing the left ventricle (LV) to increased volume load. About 3-6% of pregnancies are complicated by preeclampsia, a life-threatening condition with general endothelial damage causing vasoconstriction, hemoconcentration, edema and proteinuria. This leads to higher systemic vascular resistance but, due to endothelial leakage, a lower blood volume, i.e. exposing the LV to an increased pressure load at a normal or even decreased volume load.

The aim was to investigate how LV pumping mechanics adapt to normal pregnancy (volume load) and pregnancy complicated by preeclampsia (pressure load) in comparison to matched non-pregnant controls.

Methods: The Regional Ethical Review Board approved the study and all participants signed informed consent. Ten women with normal pregnancy and seven women with preeclampsia underwent cardiovascular magnetic resonance (CMR) imaging during their third trimester. Twelve non-pregnant controls matched for cardiac index and age were retrospectively included. All pregnant women were imaged in the left lateral decubitus position to prevent caval compression. Longitudinal contribution to stroke volume was calculated as the atrioventricular plane displacement (AVPD) multiplied by short-axis area (Figure 1).

Results: Table 1 shows subject characteristics and CMR measurements. Left ventricular AVPD was 13mm (11-17mm) in preeclampsia, 13mm (5-14mm) in normal pregnancy and 16mm (13-19mm) in non-pregnant controls. Left ventricular longitudinal contribution to stroke volume was 56% (44-75%) in preeclampsia, 44% (17-63%) in normal pregnancy and 57% (48-70%) in non-pregnant controls (Figure 2).

Conclusion: There was no difference in longitudinal pumping between women with preeclampsia and non-pregnant controls. Normal pregnancy showed lower longitudinal contribution to stroke volume compared to both women with preeclampsia and non-pregnant controls.

1913-A-1901

Left ventricular contractility is not impaired after preeclampsia compared to normal pregnancy within 3 days and 6 months postpartum: a CMR-based pressure-volume loop longitudinal study

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BACKGROUND: Preeclampsia is a pregnancy-related disease defined by hypertension and organ damage, associated with increased lifetime risk of cardiovascular disease. Left ventricular (LV) hypertrophy and systolic/diastolic dysfunction have been observed after preeclampsia. Recently a non-invasive method for estimating LV pressure-volume (PV)-loops utilizing brachial pressure and cardiovascular magnetic resonance (CMR) ventricular volumes was developed and validated. Pressure-volume loops can assess LV function including stroke work and contractility, the latter being a load-independent measure. Pressure-volume loops may thus elucidate whether alterations of cardiac function after preeclampsia are due to primary cardiac disease or secondary to physiologic adaptation. The aim was therefore to acquire LV PV-loops after pregnancy complicated by preeclampsia and after normal pregnancy 1-3 days and 6 months postpartum.

METHODS: Nine women with severe late-onset preeclampsia and 5 women after normal pregnancy were included. Blood pressure was measured non-invasively in conjunction with CMR. Left ventricular volume was quantified throughout the cardiac cycle and LV PV-loops were estimated using brachial blood pressure, time-resolved LV volumes and an estimated LV end-diastolic pressure of 3-5 mmHg in both groups.

RESULTS: Table 1 shows population characteristics. No difference was shown between groups for LV contractility 1-3 days (1.17 vs 1.16mmHg/ml) or 6 months postpartum (1.27 vs 1.08mmHg/ml; Figure 1). Stroke work decreased between 1-3 days and 6 months postpartum after pregnancy complicated by preeclampsia (1.49 vs 1.04J) and after normal pregnancy (1.26 vs 0.94J; Figure 1).

CONCLUSION: Left ventricular contractility was similar between groups immediately postpartum and did not change within 6 months. Stroke work decreased within 6 months postpartum to similar levels in both groups. Although cardiac function is preserved, changes in cardiac function during and early after preeclampsia may represent secondary physiologic adaptation to increased cardiac workload caused by increased blood pressure during preeclampsia.

1918-A-1901

Exercise-induced ST depression in asymptomatic men with no evidence of coronary artery disease

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BACKGROUND

Exercise electrocardiogram (ExECG) has a low sensitivity and specificity for ischemic heart disease in low risk populations, frequently generating false positive ST depression. In the medical assessment of smoke-diving firefighters, ExECG is still used for evaluation of cardiorespiratory fitness and cardiovascular risk, but ST segment analysis remains precarious. We aimed to characterize factors that are associated with exercise-induced ST depression in asymptomatic subjects without coronary artery disease (CAD).

METHODS

We studied 509 consecutive asymptomatic male firefighters, 46±11 years old, with no history of CAD. Medical records were reviewed during 6.1±1.7 years of follow-up, with either absent cardiac imaging studies or studies negative for CAD. ExECG test data included peak workload (Ppeak), peak blood pressure (BPpeak), peak heart rate (HRpeak), heart rate increase (HRspan) and ST depression and ST segment slope at Ppeak. ST depression of >0.1mV was considered significant (STdep). Precordial and extremity leads were analysed separately, V1 and aVL excluded. Association between ST depression and test-derived variables was assessed by age-adjusted logistic regression analysis, expressed as odds ratio (OR) with 95% confidence interval (CI).

RESULTS

During exercise, 21.6% developed STdep in at least one lead. Subjects with STdep were older than those with normal ExECG ($p<0.001$). Downsloping STdep was more common in extremity leads (8.6%) than in precordial leads (1.8%). Larger HRpeak and HRspan were associated with STdep in both precordial leads (OR 1.069, CI 1.040-1.099 and OR 1.038, CI 1.019-1.057 respectively) and extremity leads (OR 1.031, CI 1.002-1.060 and 1.030, CI 1.009-1.051 respectively). There was no statistical association between STdep and BPpeak or Ppeak, neither in precordial nor in extremity leads.

CONCLUSION

In asymptomatic men with a physically demanding occupation and no history or evidence of CAD, both age, peak HR and HR increase were associated with ST depression, whereas BP response and exercise capacity were not.

1920-A-1901

LVAD pre-treatment impede recovery of right ventricular contractility after heart transplantation

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Background

Left ventricular assist device (LVAD) causes unloading of the LV which might affect right ventricular (RV) function through reduced pulmonary vascular resistance (PVR) and increased venous return. The consequences of prior LVAD treatment on RV-function following heart transplantation (HTx) is sparsely described. We aimed to evaluate RV-function in HTx-patients pre-treated with LVAD compared to no prior LVAD treatment with echocardiography.

Methods

Twenty-eight HTx patients (24 males, LVAD n=12, non-LVAD n=16) were examined with 2D-echocardiography at 1 and 12 months post HTx (Philips iE33). RV global longitudinal strain (RVGLS) and RV lateral-wall strain (RVfree) were calculated offline (Philips Q-lab 10.3). Intra-group differences were compared using paired t-test and inter-group differences were compared using unpaired t-test. Values are expressed as mean±SD.

Results

LVAD patients had higher RVGLS and RVfree than non-LVAD group 1 month after HTx (-17.7±2,5% vs. -15.2±2.7% and -18.2%± 2.9% vs. -15.1±3.0% respectively, $p<0.05$). At twelve months RVGLS was -16.4±2.9% in the LVAD group vs. -17.9±4.5% in the non-LVAD group (n.s) and the corresponding values for RVfree was -17.3±2.9% vs. -18.1±4.3% (n.s). In the non-LVAD group, RVGLS and RVfree increased ($p<0.05$) during follow-up. We found no differences in conventional parameters (e.g. TAPSE, S´and FAC) between the two groups or between the two time-points. Invasively measured PVR were similar in the two groups pre-HTx (2.4±1 in the non-LVAD group and 2.3±1 in the LVAD group, n.s).

Conclusion

We found an initially better RV longitudinal contractility in patients pre-treated with LVAD. However, at 12 months this difference were no longer detectable. Conventional parameters of RV function failed to show any inter- or intra-group differences indicating that strain is superior in detecting small but potentially clinically relevant differences in HTx-patients. Our results suggest that LVAD pre-treatment are beneficial and might accelerate recovery of RV function after HTx.

1923-A-1901

Deterioration in the mechanics of left ventricular diastolic filling one year after coronary artery bypass grafting

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BACKGROUND: Ischemic heart disease is presumed to affect left ventricular (LV) diastolic function, but little is known about which mechanical properties of diastolic function, if any, improve or deteriorate following surgical revascularization by coronary artery bypass grafting (CABG). The mechanics of diastolic function can be evaluated using the parameterized diastolic filling (PDF) method, which uses the shape of the transmitral early inflow wave (E-wave) recorded by pulsed wave (PW) Doppler echocardiography to mathematically describe the mechanical characteristics of LV filling in terms of stiffness, and the forces and energy of filling. We sought to explore if and how the mechanics of LV filling change following CABG.

METHODS: Patients underwent transthoracic echocardiography before and one year after elective CABG. PW Doppler recordings of mitral inflow E-waves for 30 seconds (22±9 E-waves per exam) were analyzed using freely available software for PDF analysis.

RESULTS: In patients (n=54, 11% female, age 68±8 years), baseline bi-plane LV ejection fraction was 58±8% and LV end-diastolic diameter was 49±5 mm. Compared to before CABG, patients after CABG increased in LV stiffness ($p<0.001$), peak driving force of filling ($p<0.001$), peak resistive force of filling ($p=0.002$), and filling energy ($p=0.02$), see Table. By comparison, there was no change in LV viscoelasticity, filling efficiency, the estimated time constant of isovolumic pressure decay (tau), or in the load-independent index of diastolic filling ($p\geq0.16$ for all).

CONCLUSIONS: Mechanistic evaluation of the changes in diastolic function one year after CABG show deterioration in both LV stiffness, and the forces and energy involved in LV filling. Revascularization with CABG does not have a beneficial effect on diastolic LV function estimated by PDF one year after CABG. The causes of these changes remain to be investigated.

1924-A-1901

Adaptation of ventricular function the first year after heart transplantation assessed with echocardiography

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Background

Echocardiography is commonly used in evaluation of patients after heart transplantation (HTx). Detecting discrete changes in ventricular function is important but challenging using standard echocardiographic parameters. Furthermore, interpretation of findings are complicated by the fact that data on early possible adaptation is sparse. We sought to detect alterations in biventricular function using speckle tracking derived strain in the first year post HTx.

Methods

Fifty HTx patients (40 males, mean age 50±12 years) were prospectively included. Patients were examined 1 and 12 months after HTx using an iE33 platform with a S5-1 transducer and strain analysis was performed offline with a dedicated software: CMQ, Q-lab 10.3 (Philips Healthcare, Eindhoven, NL). Values were compared using paired t-test and expressed as mean±SD, 95% CI.

Results

Regarding left ventricular (LV) parameters no difference were detected between 1 and 12 months. LV ejection fraction (EF) was 58 ±5% vs. 58±7%, global longitudinal strain (GLS) was -15±5% vs. -16±4% and global circumferential strain (GCS) was -22±7% vs. -21±6% respectively. Strain measurements of right ventricular (RV) function improved between 1 and 12 months. RV GLS was -15 ±3% vs. -17±4% ($p<0.01$) and strain for the RV lateral wall (RVfree) was -15±3% vs. -18±4% ($p<0.001$) respectively. Tricuspid annular plane systolic excursion (TAPSE) improved from 13±3 mm at 1 month to 15±5 mm at 12 months. Other conventional parameters of RV function (e.g. tricuspid annular systolic velocity and fractional area change) remained unaltered.

Conclusion

Our data indicate that clinically stable HTx recipients have reached steady state regarding LV function already 1 month after transplantation. This suggests that alterations in LV function parameters after this time-point can be used to detect adverse events. On the contrary, right ventricular longitudinal function improves significantly during the first year following HTx indicating that the RV adaptation-process is extended in comparison to the LV.

1927-A-1901

Right ventricular function in pulmonary hypertension: A comparison of novel cardiac magnetic resonance derived parameters vs echocardiography

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Background:

Right ventricular (RV) function is a major determinant of outcome in patients with pulmonary hypertension (PH). In daily practice echocardiography is the first line modality although cardiac magnetic resonance (CMR) is the gold standard in assessing RV ejection fraction (RVEFCMR). Novel CMR measures of RV function have emerged, such as RV atrio-ventricular plane displacement (RVlatAVPD), maximum emptying velocity (S'CMR), RV fractional area change (RVFACCMR) and feature tracking of the RV free wall (RVFWSCMR). Theoretically these could be considered comparable to echocardiographic measurements i.e. tricuspid annular plane systolic excursion (TAPSE), tricuspid annular systolic velocity (S'), RV fractional area change (RVFAC) and RV free wall strain (RVFWS). However, comparison between these two modalities has not been evaluated. The aim of this study was to compare novel right ventricular function parameters by cardiac magnetic resonance and similar measurements by echocardiography in patients with PH.

Methods:

Fifty-five patients evaluated for PH underwent RV assessment with CMR and echocardiography. Median time between CMR and echocardiography was 1 day (IQR 1-2 days). CMR derived measurements (RVlatAVPD, S´CMR, RVFACCMR and RVFWSCMR) were compared with corresponding echocardiographic measurements (TAPSE, S´, RVFAC and RVFWS) using Pearson correlation coefficients.

Results

Mean RVEFCMR was reduced (42±14%). Superior correlation was demonstrated between RVFACCMR vs RVFAC (r=0.813) followed by RVFWSCMR vs RVFWS (r=0.707). A moderate correlation was demonstrated between RVlat AVPD vs TAPSE (r=0.649) and S´CMR vs S´ (r=0.598).

Conclusion

In patients with PH, assessment of RV function is of central importance. Our results indicate moderate to strong correlation of CMR measures of RV function with the corresponding echocardiographic measurements.

1928-A-1901

Left ventricular global wall thickness is easily calculated, detects and characterizes hypertrophy, and has prognostic utility

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BACKGROUND: Cardiovascular magnetic resonance (CMR) can be used to measure left ventricular end-diastolic volume (LVEDV) and left ventricular mass (LVM). However, there is currently no good way to measure the normality of LVM in relation to a given LVEDV. We hypothesized that a simple measure of left ventricular global wall thickness (GWT) would be accurate, beneficial for detecting and characterizing hypertrophy, and have prognostic significance.

METHODS: Subjects underwent CMR at 1.5T, including healthy volunteers (n=99) and patients assessed for heart disease (n=2828).

RESULTS: GWT calculated from LVEDV and LVM had excellent agreement with measured mean end-diastolic wall thickness of the entire left ventricle (bias 0.01±0.23mm). GWT was most predictive of death or hospitalization for heart failure in patients with normal findings by CMR (n=326, log-rank 26.8, p<0.001, median [interquartile range] follow-up 5.8 [5.0–6.7] years). GWT indexed to body surface area (GWTi) was most predictive of outcomes in patients with normal LVEDV index (n=1352, log-rank 36.4, p<0.001, follow-up 5.5 [4.1–6.5] years). Patients with concentric remodeling had worse prognosis than the normal patients (p=0.02), and the patients with hypertrophy had worse prognosis than both normal patients (p<0.001) and patients with concentric remodeling (p=0.045), see Figure 1. Of patients with suspected heart disease but normal CMR findings regarding left ventricular volumes, function, mass, and scar, 22% were found to have increased mean GWTi corresponding to concentric remodeling, see Figure 2.

CONCLUSIONS: Left ventricular GWT is an intuitive measure that can be easily calculated from mass and volume with high accuracy, and has prognostic utility in patients with normal CMR findings. Also, GWTi classifies hypertrophy as concentric or eccentric, and detects concentric remodeling in a substantial portion of patients with otherwise normal findings.

1929-A-1901

Preoperative Disturbances of Glucose Metabolism and Mortality after Coronary Artery Bypass Grafting

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Background: Disturbances of glucose metabolism are important risk factors for coronary artery disease and increase mortality risk. The aim was to investigate the association between preoperative disturbances of the glucose metabolism and long-term all-cause mortality after Coronary Artery Bypass Grafting (CABG).

Methods: 497 patients without known diabetes, aged 40-86 years, undergoing a first isolated CABG at Karolinska University Hospital during 2006-2013 were included. All patients underwent an Oral Glucose Tolerance Test (OGTT) prior to CABG. The patients were categorized as having normal glucose tolerance (NGT), prediabetes (impaired glucose tolerance) and newly discovered diabetes. Data was collected from SWEDEHEART. Cox regression was used to calculate adjusted hazard ratios with 95% confidence intervals for death in patients with prediabetes, and diabetes using NGT as reference.

Results: According to the OGTT, 170 patients (34%) had NGT, 219 patients (44%) had prediabetes and 108 patients (22%) had newly discovered diabetes. Baseline characteristics were similar between the groups except for a slightly higher age among patients with newly discovered diabetes. There were 133 (27%) deaths during a mean follow-up time of 10 years. The Kaplan-Meier estimated 10-year survival was 77% (69-83%), 83% (77-87%), and 71% (61-79%) in patients with NGT, prediabetes, and newly discovered diabetes, respectively. There was no significant difference in all-cause mortality between different glucose tolerance groups after multivariable adjustment for differences in baseline characteristics.

Conclusions: Patients with prediabetes or newly discovered diabetes prior to CABG, had similar long-term survival compared with patients with normal glucose tolerance.

1930-A-1901

Matrix Metalloproteinases in COPD and atherosclerosis with emphasis on the effects of smoking

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Background:

Matrix metalloproteinases (MMP´s) are known biomarkers of atherosclerosis. MMP´s are also involved in the pathophysiological processes underlying chronic obstructive pulmonary disease (COPD). Cigarette smoking plays an important role in both disease states and is also known to affect the concentration and activity of MMP´s systemically. Unfortunately, the epidemiological data concerning the value of MMP´s as biomarkers of COPD and atherosclerosis with special regards to smoking habits are limited.

Methods:

450 middle-aged subjects with records of smoking habits and tobacco consumption were examined with comprehensive spirometry, carotid ultrasound examination and biomarker analysis of MMP-1, -3, -7, -10 and -12. Due to missing data 33 subjects were excluded.

Results:

The remaining 417 participants were divided into 4 different groups. Group I (n=157, no plaque and no COPD), group II (n=136, plaque but no COPD), group III (n=41, COPD but no plaque) and group IV (n=83, plaque and COPD). Serum levels of MMP-1,-7, -10-12 were significantly influenced by smoking, and MMP-1, -3, -7 and-12 were elevated in subjects with COPD and carotid plaque. This remained statistically significant for MMP-1 and-12 after adjusting for traditional risk factors.

Conclusion:

COPD and concomitant plaque in the carotid artery was associated with elevated levels of MMP-1 and -MMP-12 even when adjusting for risk factors. Further studies are needed to elucidate if these two MMP´s could be useful as biomarkers in a clinical setting. Smoking was associated with increased serum levels of MMP´s (except MMP-3) and should be taken into account when interpreting serum MMP results.

1931-A-1901

How does successful bridging with ventricular assist device affect cardiac transplantation outcome?

Gino Jakobsson, Sorosh Esmaily

Introduction: The development of left ventricular assisst device (LVAD) has been rapid the recent years and bridge to transplant (BTT) therapy has become the standard of care for many patients awaiting heart transplant (HT). However, LVAD has been associated with an increased risk of allosensitization. Previous studies have investigated the impact of allosensitization on post transplantation outcomes, but their results have been inconclusive.

Aim of the study: To investigate whether there is a difference in post transplantation outcomes between patients who received Heartmate II (HM II) and patients who did not receive BTT, all of them transplanted at Sahlgrenska University Hospital (SU).

Methods: This is a retrospective single-center cohort study of 40 patients who underwent HT without (Group HT, n= 20) or with (Group HT + HM II, n=20) MCS as BTT. The patients were matched regarding age, sex and diagnose that preceded HT. Data was collected thrugh medical records and TIGER (a quality register administrated by SU). The following outcomes were analyzed at the 1-year post transplant follow up: overall survival, cellular rejections, cardiac allograft vasculopathy and allograft function (measured with cardiac catheterization and echocardiography).

Results: Patients who received HM II as BTT did not show any difference in measured post transplantation outcomes compared to patients who did not receive any MCS as BTT.

Conclusions: Our study supports international results suggesting that HM II is a good treatment for patients with end stage heart failure waiting for HT and does not affect outcome 1-year post transplant.

1934-A-1901

Intraaortic Balloon Support for Myocardial Infarction with Cardiogenic Shock – A report from Swedish Coronary Angiography and Angioplasty Registry

Elmir Omerovic

Background: Cardiogenic shock (CS) remains the leading cause of in-hospital death in acute myocardial infarction (MI) and is associated with a mortality rate of ~50%. Intraaortic balloon support (IABP) was class I ESC guideline recommendation for treatment of CS for many years, but this recommendation was changed to class III after the IABP-SHOCK II study. The aim of this large prospective observational study was to evaluate the impact of IABP on 30-days mortality and in-hospital complications in patients with CS.

Methods: We used data from the Swedish Coronary Angiography and Angioplasty Registry (SCAAR), which contains information about all PCI procedures performed in Sweden (31 hospitals). We included all procedures from 2005 to 2018 in patients with CS due to MI and divided the patients according to whether or not they were treated with IABP. We used instrumental variable analysis to adjust for differences in patient characteristics and hidden bias. Treating hospital was used as a treatment-preference instrumental variable using two-stage least squares regression. Multilevel modeling was used to adjust for clustering of observations in a hierarchical database. The in-hospital complication was defined as the occurrence of any of the following events: major bleeding, minor bleeding, extended compression of the access artery, blood transfusion, surgical revision of the access artery, neurologic complication.

Results: In total, 2,991 patients with CS were included in the study. Of these, 737 (25%) were treated with IABP. In the combined cohort, there were 1,554 (52%) deaths 30 days after PCI and 1,239 (41%) cases of in-hospital complications. IABP was not associated with death at 30 days (risk reduction [RR] -1.1 %; 95% confidence interval [CI] -15.7;13.5; P= 0.881). However, IABP was associated with a higher risk of in-hospital complications (RR 35.4%; 95% CI 17.7-53.1; P<0.001).

Conclusion: In this observational study, treatment with IABP, was not associated with 30-days mortality in patients with CS. However, risk of in-hospital complications was substantially higher in patients with CS who were treated with IABP. Our observational study supports class III recommendation by the current ESC guidelines for the use of IABP in CS.

1935-A-1901

A lifestyle and self-care focused smartphone application can improve risk factor outcomes in cardiac rehabilitation for patients after a myocardial infarction

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Background: The aim of this study was to assess the efficacy of a web-based smartphone application designed to support adherence to lifestyle advice and self-control of risk factors, as a complement to traditional cardiac rehabilitation (CR) for improving risk factor control in patients after myocardial infarction (MI).

Methods: In this multi-centre randomized controlled trial, we included 150 patients with MI (81% men, 60.4±8.8 years) who participated in CR. Additionally, patients randomized to the intervention received access to the smartphone application. We assessed changes in a) dietary and smoking habits, weight, blood pressure (BP) and lipid profile between baseline, 2-weeks and 6 -10 weeks follow-up and b) self-rated physical activity and submaximal aerobic capacity (W) between 2-weeks and 6-months follow-up. Regression analyses were performed on an intention-to-treat basis, adjusting for age, sex and baseline risk factors.

Results: Patients in the intervention group achieved a larger reduction in BP than patients in the control group at 2-weeks (systolic BP -28±27 vs -16±24 mmHg, p=0.01) and 6-10 weeks (systolic BP -25±27 vs -16±27 mmHg, p=0.02; diastolic BP -13±16 vs -9±13 mmHg, p=0.046) (Figure 1). Patients in the intervention group who smoked at baseline were more often abstinent from smoking at 6-10 weeks, compared to patients in the control group (76% vs 36%, p=0.03). While patients in the intervention group consumed significantly more fish and fruit at 2-weeks, there was no difference between the groups at 6-10 weeks post-MI. There was no difference between the groups in lipid levels, weight, or self-rated physical activity. Both groups increased their submaximal aerobic capacity between 2-weeks and 6-months (intervention 13.6±19.9 W vs control 10.3±16.1 W, p=0.4).

Conclusion: Complementing traditional CR with a web-based smartphone application supporting adherence to lifestyle advice and self-control of risk factors has the potential to improve blood pressure and tobacco abstinence after an MI.

1936-A-1901

Is there any correlation between strain parameters and filling pressure in heart transplant recipients?

Julia von Brömsen, Bente Grüner Sveälv , Entela Bollano

Background

Heart transplant (HTx) recipients are at risk of diastolic dysfunction and increased mortality. A reliable non-invasive marker like the left ventricular global longitudinal strain (LVGLS) could help identifying elevated filling pressures in this population and simplify long term follow-up.

Aim

The purpose of this study was to assess agreement between deformation imaging by 2D speckle-tracking echocardiography (STE) and cardiac catheterization (filling pressure) in heart transplant (Htx) recipients.

Method

We evaluated 50 HTx patients who underwent 2D speckle-tracking echocardiographic imaging (STE) and right-sided heart catheterization (at rest and during sub maximal exercise) at one year post transplantation at Sahlgrenska University Hospital. Left ventricular filling pressure (LVFP) was estimated invasively by measuring the pulmonary capillary wedge pressure (PCWP). Mean Pulmonary artery pressure (PAm); cardiac output (CO), were recorded.

Results:

We did not observe any significant relation between non-invasive STE-derived parameters and cardiac catheterization: Spearman ´s rank correlation presented following values derived from non-invasive STE-derived parameters and catheterization. E/GLS and PCWP rest ρ = -0.027 (p=0.85), E/GLS and PCWPexercise ρ = -0.11, (p=0.44), E/GLS and PAm rest ρ = -0.07 (p=0.63), E/GLS and PCWPexercise ρ = -0.18 (p=0.24). E/GLS and CO-rest ρ = -0.12 (p=0.4128), E/GLS and CO exercise ρ = -0,15 (p=0.34). The coefficient of variation (CV%) within two observers were: Ejection fraction (7,22%), and GLS (22,5%.)

Conclusion:

This study indicates that non-invasive STE-derived parameters are lacking the predictability in estimating filling pressure and diastolic function in an HTx population and should be interpreted with caution.

1937-A-1901

Early post-transplant elevated pulmonary artery pressure predicts adverse outcome in cardiac recipients

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Aim:

To investigate the prognostic value of hemodynamics on mortality at 5 years after heart transplantation (Htx).

Methods and Results:

A total of 290 Htx recipients who completed the first year evaluation with right heart catheterization were included. In order to study the effect of the post-transplant hemodynamic variables on 5-year outcome, the cohort was stratified into several subgroups. For mean pulmonary artery pressure (mPAP), right atrial pressure (RAP), pulmonary artery wedge pressure (PAWP), and pulmonary vascular resistance (PVR), patients with values from the upper 10th percentile (high), were compared with those with values from the remaining lower 90th percentile (normal). For cardiac index (CI), patients with values from the lower 10th percentile (low) were compared with those with values from the remaining upper 90th percentile (normal). The endpoint was death or re-transplantation within 5 years of Htx and occurred in 39 patients (13,1%). This was related to graft failure in 13 of cases (33 %) and non-cardiac causes, in 26 of cases (67 %). mPAP ≥ 23 mmHg at 1-year was associated with poor outcome. No differences on outcome between subgroups stratified with respect to high versus low RAP, PAWP, CI or PVR. mPAP as a continuous variable was strongly associated with mortality independently of age, sex, donor age, PAWP, pre-transplant mPAP, heart failure etiology. An increase of 1 mmHg in mPAP raised the mortality rate with 11% during the 5 years follow-up period.

Conclusion:

mPAP higher than 23 mmHg at first annual evaluation predicted 5 years outcome after heart transplantation.

1938-A-1901

Prevalence of transthyretin cardiac amyloidosis in an unselected heart failure population – time for screening?

Krister Lindmark, Björn Pilebro, Intissar Anan, Sandra Arvidsson, Torbjörn Sundström, Ole Suhr

Introduction:

Cardiac transthyretin amyloidosis (ATTR) is more common in heart failure than previously known. ATTR caused by wild type TTR (ATTRwt) is more common than that caused by mutant TTR (ATTRm). Cardiac manifestations include arrythmias, increased wall thickness and restrictive left ventricular filling pattern leading to heart failure. Diagnostics has been simplified by scintigraphy using bone tracers, e.g. Tc-PYP and Tc-DPD. Little is known about the prevalence of ATTR in an unselected heart failure population.

Hypothesis:

Our hypothesis is that cardiac amylodosis due to ATTR is common in heart failure and that screening heart failure patients with increased wall thickness by bone scintigraphy is an effective way of detecting the disease.

Methods:

All patients living within the catchment area of Umeå University Hospital with a diagnosis of heart failure between 2010 and 2016 were included. Of those, all with a septum measurement (IVS) of ≥15 were referred for a Tc-DPD-scintigraphy.

Results:

Out of 2024 patients with heart failure 141 patients had IVS ≥15 mm. Out of these, 24 had a known diagnosis (11 ATTRm, 4 ATTRwt and 9 hypertrophic cardiomyopathy). So far, 35 patients have been examined with Tc-DPD and 11 of these display a positive uptake. Two of those with a grade 1 intensity using Perugini score, which may reflect early disease. The rest had grade 2 uptake. No patient with positive scan had pathological kappa/lambda quota suggesting AL amyloidosis.

Conclusions:

Cardiac ATTR amyloidosis is common in an unselected heart failure population. Approximately one third of patients with IVS ≥ 15 mm and normal ECG voltage have a positive Tc-DPD indicating that cardiac ATTR amylodosis is an underdiagnosed condition.

1939-A-1901

Long-term survival in patients with stable angina pectoris undergoing percutaneous coronary intervention with or without intracoronary pressure wire guidance: a report from the Swedish Coronary Angiography and Angioplasty Registry (SCAAR)

Background: Intracoronary pressure wire measurements of fractional flow reserve (FFR) and instantaneous wave-free ratio (iFR) provide decision-making guidance during percutaneous coronary intervention (PCI). However, limited data exist on the impact of FFR/iFR on long-term clinical outcomes in patients with stable angina pectoris.

Methods: We used data from the Swedish Coronary Angiography and Angioplasty Registry (SCAAR) on all patients undergoing PCI (with or without FFR/iFR guidance) for stable angina pectoris in Sweden between January 2005 to March 2016. The primary endpoint was all-cause mortality, and the secondary endpoints were stent thrombosis (ST) or restenosis and periprocedural complications. The primary model was multilevel Cox proportional-hazards regression adjusted with Kernel-based propensity score matching.

Results: In total, 27,354 patients underwent PCI for stable angina pectoris; of these, FFR/iFR guidance was used in 3,699. After a median follow-up of 1813 (range 0-4089) days, the FFR/iFR group had lower adjusted risk estimates for all-cause mortality [hazard ratio (HR) 0.79; 95% confidence interval (CI) 0.69-0.91; P=0.001], and ST and restenosis (HR 0.71; 95% CI 0.56-0.91; P<0.001). The number of periprocedural complications did not differ between the groups [adjusted odds ratio 0.96; 95% CI 0.83-1.13, P=0.673].

Conclusions: In this observational study, the use of FFR/IFR was associated with a lower risk of long-term mortality, ST and restenosis in patients undergoing PCI for stable angina pectoris. Our study supports the current European and American guidelines for the use of FFR/iFR during PCI and shows that intracoronary pressure wire guidance has prognostic benefit in patients with stable angina pectoris.

1941-A-1901

Cardiac Re-transplantation – a reasonable treatment option in selected patients with severe graft failure

Pia Dahlberg, Niklas Bergh, Sven-Erik Bartfay, Erik Holmberg, Hans Liden, Carl-Johan Malm, Kristjan Karason, Entela Bollano, Göran Dellgren

Cardiac re-transplantation (re-Tx) has been considered controversial due to shortage of donor organs and suboptimal results. We studied the results of cardiac re-Tx and compared it with primary heart transplantation (HTx) at our center.

Methods

A total of 674 heart transplantations were carried out at our center between 1984 and 2016. 19 of those were re-transplantations. We evaluated pre-operative characteristics, cause of graft-loss and outcome among patients undergoing cardiac re-Tx and compared them with the primary HTx.

Results

19 patients (14 male, 5 female) received a second HTx . The mean age at re-Tx was 35 as compared to 45 years for the primary HTx group. Mean donor age for the re-Tx and primary HTx was 42 and 37 years, respectively. The primary cardiac diagnosis for re-Tx patients was DCM (n=11), myocarditis (n=3), IHD (n=2), CHD (n=2) and unknown (n=1). The causes of graft loss in re-Tx group were acute rejection (n=5), coronary allograft vasculopathy (CAV) (n=5), and unexplained graft failure (n=10). The median time interval between primary and re-Tx was 49 months (range 0- 305 months). Patients undergoing re-Tx were more often in need of pre-operative dialysis (37%) as compared with primary HTx (1.5%). The re-Tx group was also, more often treated with a short-term MCS (37 %) than those receiving a primary HTx (19%). The 1-, 5- and 10-year survival rates for re-Tx and primary HTx were 84/55/42% and 88/78/65%, respectively. Causes of death in the re-Tx group included acute transplant related death (n=1), cardiac death (n=2) and non-cardiac causes (n=3).

Conclusion

During a 30-year period, 2.8% of our HTx population underwent a re-Tx. The most common cause was unexplained graft failure, followed by acute rejection and CAV. Although inferior to primary HTx, cardiac reTx offers a reasonable long-term outcome and should therefore be offered to selected patients.

1942-A-1901

Regional differences in the incidence and prognosis of the takotsubo syndrome

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Background: Takotsubo syndrome (TS) is an acute cardiac syndrome with a clinical presentation that is very similar to acute myocardial infarction (AMI). Similar to AMI, TS carries a considerable risk of severe complications and death. Whereas regional differences exist in the care and outcome for patients with AMI, it is unknown whether regional differences exist in the care and outcome of patients with TS.

Methods: Using the nationwide Swedish Angiography and Angioplasty Registry (SCAAR) we identified 2,898 patients with TS in Sweden between January 2009 and February 2018. We compared the six health care regions in Sweden in regards to both the incidence of TS among patients with suspected acute coronary syndrome, and the prognosis for patients with TS.

Results: The reported incidence of TS was highest in the Western health care region (Västra Götaland) whereas unadjusted and adjusted mortality for patients with TS was highest in the Southern health care region (Figure). With the Western health care region as the reference region, the adjusted 5-year mortality risk increased from North to South (hazard ratio [HR] 0.62, 95% confidence interval [CI] 0.31 – 1.23 for the Northern versus Western region; and HR 1.30, 95% CI 0.88 – 1.90 for the Southern versus Western region, ptrend=0.031).

Conclusions: The incidence and prognosis of TS differed between different health care regions within Sweden. The extent to which these observed differences relate to socioeconomic factors, rural-urban differences, climate and other geographical factors, and regional health care policies remains to be established.

1943-A-1901

Clinical Outcomes for Patients with Takotsubo Syndrome Versus Patients with Myocardial Infarction

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Background: Takotsubo syndrome (TS) is a potentially life-threatening acute cardiac syndrome with a clinical presentation very similar to myocardial infarction (MI) and for which the natural history, management and outcome remain incompletely understood. The aims of this study were to assess the relative short- and long-term mortality risk of TS , ST-elevation MI (STEMI) and non STEMI (NSTEMI) and to identify predictors of in-hospital complications and poor prognosis in patients with TS.

Methods: Using the nationwide Swedish Angiography and Angioplasty Registry (SCAAR) we identified almost all (n=117,720) patients who underwent coronary angiography due to TS (N=2,898 [2.5%]), STEMI (N=48,493 [41.2%]) or NSTEMI (N=66,329 [56.3%]) in Sweden between January 2009 and February 2018.

Results: Patients with TS were more often women as compared with patients with STEMI or NSTEMI. TS was associated with unadjusted and adjusted 30-day mortality risks lower than STEMI (adjusted hazard ratio [adjHR] 0.60, 95% confidence interval [CI] 0.48-0.76, p<0.001), but higher than NSTEMI (adjHR 2.70, 95% CI 2.14-3.41, p<0.001). Compared to STEMI, TS was associated with similar risk of acute heart failure (adjHR 1.26, 95% CI 0.91–1.76, p=0.16) but lower risk of cardiogenic shock (adjHR 0.55, 95% CI 0.34–0.89, p=0.02). The relative 30-day mortality risk for TS versus STEMI and NSTEMI was higher for smokers than non-smokers (adjusted pinteractionSTEMI=0.01 and pinteractionNSTEMI=0.01).

Conclusion: Thirty-day mortality in TS was higher than in NSTEMI but lower than STEMI, despite a similar risk of acute heart failure in TS and STEMI. Among patients with TS, smoking was an independent predictor of mortality.

1944-A-1901

Trends in outcomes in patients with acute ischemic heart failure: A report from Swedish Angiography and Angioplasty Registry

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Background: Acute ischemic heart failure (AIHF) is the most common cause of death for patients with ST-elevation myocardial infarction (STEMI). The most severe form of AIHF, cardiogenic shock, carries a particularly poor prognosis. We sought to determine whether the incidence and prognostic impact of AIHF and CS in STEMI have been reduced over the last eight years.

Methods: Using the nationwide Swedish Angiography and Angioplasty Registry (SCAAR) we identified patients who underwent primary PCI due to STEMI in Sweden between January 2010 and April 2018. We defined IAHF as Killip class ≥2 and cardiogenic shock as Killip class 4. The primary endpoint was mortality at 30 days.

Results: We identified 40,701 patients who underwent primary PCI during the study period with known vital status at 30 days, for whom Killip class was reported for 40,365 (99.2%). AIHF occurred in 3,456 (8.6%) of these patients, and 955 (2.4%) developed cardiogenic shock. Thirty-day mortality for the overall STEMI cohort was 5.9%, whereas 30-day mortality for patients with AIHF and CS were 27.7% and 48.8%. respectively. The incidence of AIHF decreased somewhat (ptrend=0.006), whereas the incidence of CS did not (ptrend=0.77)(Figure). In contrast, we observed an improvement over the study period in the prognosis of CS (ptrend=0.004) but not AIHF (ptrend=0.065) (Figure).

Conclusions: The incidence and prognostic implications of AIHF among patients with STEMI have improved slightly over the eight years. However, AIHF, and particularly CS, is still associated with a very high risk of dying.

1945-A-1901

Sex Differences in Platelet Reactivity in Patients with Myocardial Infarction treated with Thriple Antiplatelet Therapy

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Background

Platelet activation and clot formation play an important role in the pathogenesis of myocardial infarction (MI). Dual antiplatelet therapy (DAPT), consisting of aspirin and a P2Y12-inhibitor, is the cornerstone treatment. Bleeding is the most common non-ischemic complication in MI, especially in women, and is associated with worse outcome. The reasons for the observed sex difference is incompletely understood, but one suggested explanation has been excess dosing of antithrombotic drugs in women. There are no previous sex specific reports on platelet activity in MI patients treated with aspirin, clopidogrel and GPIIb/IIIa-inhibitors. Thus, the aim of this study was to assess sex differences in platelet activity in patients treated with three different platelet inhibitors.

Methods

We recruited 125 patients (37 women and 88 men) with MI, scheduled for coronary angiography. All patients received clopidogrel and aspirin. A subgroup of patients received glycoprotein (GP) IIb/IIIa-inhibitor. Platelet aggregation in whole blood was assessed at several time points, using impedance aggregometry. Soluble P-selectin was measured 3 days after admission.

Results

There were no significant sex differences in baseline features or comorbidities except higher frequency of diabetes, lower hemoglobin value and worse renal function in women. We observed significantly more in-hospital bleeding events in women compared to men (18.9% vs 6.8%, p=0.04). There were no differences in platelet aggregation using three different agonists, reflecting treatment effect of GPIIb/IIIa-inhibitors, clopidogrel and aspirin, at 6-8 hours, 3 days, 7-9 days or 6 months after loading dose. Moreover, there was no significant difference in soluble P-selectin.

Conclusion

The main finding of this study was a consistent lack of difference between the sexes in platelet aggregation, using three different agonists at several time-points. Our results do not support a difference in platelet inhibition or excess dosing of antiplatelet drugs as major explanations for increased bleeding risk in women.

1946-A-1901

Genetic screening of familial hypercholesterolemia in Västra Götaland: A 5 year experience

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Background

Familial hypercholesterolemia (FH) is the most common dominant genetic disorder (estimated prevalence 0.5%) affecting circulating LDL cholesterol levels and thus giving a 10 fold increased risk for coronary artery disease and a reduction in life expectancy of 15 years. Treatment is very effective if established in time, but early diagnosis is challenging due to the fact that most FH individuals are asymptomatic until their first ischemic event. Our aim is to implement early FH diagnosis in Västra Götaland through genetic testing of probands and cascade screening of first degree relatives.

Methods

Next generation sequencing (NGS) of FH-causative genes (LDLR, APOB, PCSK9, LDLRAP and STAP1) is performed on all individuals referred to Sahlgrenska Lipid Clinic with a Dutch Lipid Network Score of 4 or more. First degree relatives of individuals in whom a mutation is found are then tested by Sanger sequencing for the same mutation.

Results

Between 2014 and 2018 we have tested 500 individuals. We have found a causative mutation in 227 individuals. Of all the mutations, 1 was found in the STAP1 gene, 2 in the LDLRAP gene, 3 in the PCSK9 gene, 9 in the APOB gene and the remaining in the LDLR gene. All individuals with mutations where heterozygous except for 2 homozygous and 2 compound heterozygous. The average untreated LDL levels for those with a mutation were 7.6 mmol/L, while for those without mutation where 6.6. We have also tested 282 first degree relatives, and found 161 mutations in them.

Conclusions

Since the start of genetic screening in Västra Götaland in 2014, we have diagnosed 500 individuals with at least probable clinical FH and found in total 388 carriers of causative mutations. These individuals are now treated in order to diminish (in secondary prevention) or abolish (in primary prevention) their cholesterol-related cardiovascular risk.

1947-A-1901

Myocardial Deformation After ST-Elevation Infarction Measured by CMR Feature Tracking Strain

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Background: Left ventricular (LV) functional assessment is of imminent value after ST-elevation infarction (STEMI). LV longitudinal strain (LS) evaluates ventricular function on a myocardial level. Feature Tracking (FT) assesses strain from cine cardiac magnetic resonance (CMR) images. It is unknown how LV FT Regional LS (RLS) and Global LS (GLS) changes between the sub-acute and chronic phase after STEMI compared to controls and how GLS and RLS are related to culprit vessel (LAD, LCX or RCA) and infarction size (IS).

Aims: To assess 1) GLS with FT after 2-6 days (sub-acute) and 6 months (chronic phase) after STEMI compared with controls, 2) if GLS changes between sub-acute and chronic phase, and 3) the relationship between GLS and RLS to IS and infarct location.

Methods and Results: Seventy-seven patients underwent CMR 2-6 days and 6 months after STEMI as well as 27 healthy controls. GLS was impaired at the sub-acute (-8.9±2.3%) and chronic phase (-14.3±2.9%) compared to controls (-18.4±2.4%; $p<0.001$ for both). GLS improved between the sub-acute and chronic phase ($p<0.001$). GLS correlated to IS (R=0.47 sub-acute; 0.49 chronic, $p<0.001$). LAD infarctions had lowest GLS and largest IS. RLS was more impaired in the culprit vessel territory compared to remote. RLS in the RCA region was lower for LAD than RCA infarctions. RLS was impaired in all 6 wall-regions in LAD infarctions, while LCX and RCA infarctions had preserved RLS in remote myocardium.

Conclusion: GLS is impaired after STEMI and improves, but do not normalize, to the chronic phase. GLS is only moderately correlated to IS, indicating that other factors and co-morbidities are important to determine ventricular function. Even though RLS is most impaired in the affected region, remote regions can be substantially impaired in LAD-infarctions, why it would be difficult to pinpoint the culprit vessel based on RLS.

1949-A-1901

Not all LGE was created equal – comparison of the impact of LGE size on left ventricular ejection fraction in infarction versus myocarditis

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Background: Myocardial necrosis identified by late gadolinium enhancement (LGE) is a poor prognostic sign regardless of origin. Common causes for LGE are infarction and myocarditis, which can be identified by cardiovascular magnetic resonance. The impact of LGE caused by myocarditis on cardiac function compared to infarction LGE is poorly understood. Therefore, the aim of this study was to compare the effects of infarct and myocarditis LGE on left ventricular (LV) function.

Methods: Consecutive patients scanned at 1.5T (Area, Siemens Healthcare, Germany) were retrospectively enrolled by final diagnosis (infarction, n=41, age 57±11 years, 32% females, and myocarditis, n=84, age 44±17 years, 27% female). LGE images were acquired using a phase sensitive inversion recovery (PSIR) sequence following intravenous contrast (Gadovist, 0.2 mmol/kg, or Dotarem, 0.2 mmol/kg). LGE images were analyzed using Segment (Medviso, Lund, Sweden) for quantification of myocardial LGE size in percent of the left ventricle. LV ejection fraction (LVEF) was measured by a cine short-axis stack using dedicated software. The maximum predicted LVEF in relation to myocardial LGE size has previously been described as maximum predicted LVEF=72.2-1.18*LGE size. The dysfunction index was calculated as the difference between the reported LVEF and the maximum predicted LVEF. The dysfunction index reflects the balance between LVEF and LGE size. The median dysfunction index was compared between patients with infarct and myocarditis, respectively.

Results: The relationship between LGE size and LVEF is displayed in Figure 1. The dysfunction index was higher for infarct LGE compared to myocarditis LGE (13 [6-20] vs 8 [2-14] %, p=0.01), Figure 2.

Conclusion: The reduction in LVEF due to LGE is greater for infarction compared to myocarditis. Patients with extensive LGE due to myocarditis can still have a preserved EF. This study provides insights into the differences in impact of LGE on LVEF in infarction compared to myocarditis.

1950-A-1901

Temporal electrocardiographic changes over the acute and subacute phase of the takotsubo syndrome

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Background: Takotsubo syndrome (TS) is characterized by severe but reversible left ventricular dysfunction triggered by emotional or physical stress, with a clinical presentation closely resembling that of acute myocardial infarction (AMI). ECG changes are also similar in TS and AMI. Whereas some reports have suggested that some ECG findings, such as inverted T-waves, are particularly common in TS, more detailed understanding of the ECG findings in TS is lacking.

The objective of this study is to investigate the temporal patterns of electrocardiographic changes in the acute phase of TS.

Methods: Using the Swedish Coronary Angiography- and Angioplasty Registry (SCAAR) we will identify all patients with TS who were treated at Sahlgrenska University Hospital between 2008 and 2017. The TS diagnosis will be validated using the revised Gothenburg diagnostic criteria. All standard 12 lead ECGs during hospitalization and at follow up will be analyzed.

Results: We have currently analyzed admission-ECGs for 167 TS patients. The remaining ECGs are being analyzed and will be available at the time of presentation. ECG findings on days 0, 1, 2, 3, 4, 7, 30 and 365 are summarized in the table. At admission, ST-elevation was present in 56% of the patients, of whom 7% having reciprocal ST-changes. Pathological Q-waves were present in 31% of patients at admission. T-wave inversion was observed in 49% at admission and in 78% at day 2.

Conclusions: Our preliminary results show that among patients with TS, ST-elevation and T-wave inversion appear to be the most common pathological ECG-changes at admission. After analyzing the remainder of the ECGs, we will be able to provide the largest and most detailed description to date of the temporal ECG-changes in TS.

1951-A-1901

Blood correction of native T1 increases detection of cardiac involvement in patients with fabry disease

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Background:

Fabry disease (FD) is a rare, lysosomal storage disorder with myocardial sphingolipid accumulation detectable by CMR native T1 mapping. Myocardial native T1 is affected by intramyocardial blood, and as blood has a longer and more variable T1 compared to myocardial T1, blood correction of myocardial T1 has been proposed. Therefore, the purpose was to investigate whether blood correction of native T1 values increases the detection of myocardial sphingolipid accumulation (low native T1) in FD patients.

Methods:

A retrospective multinational multicenter study, FD patients (n=218, age 47±16 years) and healthy volunteers (n=117, age 29±5 years) underwent CMR at 1.5T (Siemens) at three different sites with a comparison set of non-FD patients (n=200, age 51 ± 18 years) at a fourth site. Native T1 maps used MOLLI. T1 was measured with a single region of interest in the LV septum, and both LV and RV blood pools. A linear correction model using mean R1 (1/T1 average LV + RV blood) was developed at the fourth site as previously described (1), and applied to the FD population and healthy volunteers. Sphingolipid accumulation in FD patients was defined as a native myocardial T1 value below the site specific 95% limits of agreement in healthy volunteers, both for corrected and uncorrected measures.

Results:

Prior to blood correction, 134 FD patients (61%) had low myocardial native T1 indicating sphingolipid accumulation (84 (39%) normal myocardial native T1). Of the 84 patients with normal native T1 prior to blood correction, 25 (30%) were reclassified as having low myocardial native T1 following blood correction. Of these 25 reclassified patients, 14 (56%) did not have any CMR signs of cardiac involvement by late gadolinium enhancement or left ventricular hypertrophy. Thus, 14/84 (17%) were reclassified as having cardiac involvement following blood correction. By comparison, 4/134 (3%) of patients with low native T1 prior to blood correction were reclassified to normal myocardial native T1 following blood correction.

Conclusion:

Blood correction of myocardial native T1 increases the detection of low myocardial native T1 in 17% of patients with Fabry disease that otherwise had no CMR signs of cardiac involvement. Blood correction of myocardial native T1 has the potential to impact the ability to detect and track cardiac involvement in Fabry disease, and merits prospective studies and histological validation.

1952-A-1901

A radial sector-wise golden-step (SWIG) phase contrast sequence with high temporal resolution for evaluation of diastolic dysfunction – comparison to Doppler echocardiography

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Background

Conventionally, transmitral blood-flow velocity (E, A) and myocardial velocity in early filling (e′) are measured with pulsed wave Doppler echocardiography. The aim of this study was to demonstrate the ability to measure these parameters with CMR using a novel pulse sequence to acquire high temporal resolution phase-contrast images in a single breath-hold.

Methods

Consecutive patients (n=20, age 54±17 years, 30% female) underwent CMR at 1. 5T or 3T (Siemens, Erlangen, Germany). All velocities were measured in a basal short-axis slice during a single breath-hold with a novel phase contrast radial sector-wise golden-step (SWIG) pulse sequence, allowing for 150–250 frames/cardiac cycle, corresponding to a temporal resolution of 6.8 ms. Quadratic static tissue correction and phase-unwrapping was performed using Segment v2.1 R6069 (Medviso AB, Lund, Sweden). Mitral blood flow velocities (E, A) and myocardial tissue velocities (s′, e′, and a′; septal and lateral) were measured in a 5 mm3 volume of interest, figure 1. Echocardiographic velocities were obtained with pulsed wave Doppler. Group differences were tested by Wilcoxon signed-rank test and agreement between the methods with Bland-Altman plots.

Results

For myocardial tissue velocities, Doppler and CMR did not differ (p = 0.67) with R2 = 0.86 (p<0. 001), mean-difference 0.4 cm/s and 95% LoA ±2.1 cm/s, figure 2. Transmitral blood-flow velocities correlated with R2=0. 67 (p<0.001), but were underestimated by CMR (p<0.05), mean-difference -16 cm/s, 95% LoA ±22 cm/s, figure 3. Derived parameters: E/e′, R2 = 0.82, p<0. 001, mean-difference -2.5, 95% limits ±3.7, and E/A R2 = 0.66, p<0.001, mean-difference 0.1, 95% limits ±0.8.

Conclusion

Myocardial tissue velocities measured with the SWIG method show excellent agreement with Doppler echocardiography, albeit with a slightly lower transmitral blood flow velocity by CMR. Future work will explore if the blood velocity measures can be improved by measuring in a long-axis slice.

1954-A-1901

IL-6 response to acute physical exercise in patients with coronary artery disease

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Background

The interleukin(IL)-6 pathway has a causal role in coronary artery disease (CAD) and elevated levels of IL-6 in plasma are associated with increased risk of myocardial infarction (MI). IL-6 in plasma is also assessed to study inflammatory response to acute stress. However, the effect of acute stress on IL-6 levels in patients with CAD has been less investigated. Here, the aim was to examine the IL-6 response to acute physical stress in patients with known or suspected CAD.

Methods

Twenty-three patients with recent MI (<1 month) performed a submaximal cycle ergometer test. Another cohort of 115 patients underwent myocardial perfusion scintigraphy with a maximal cycle ergometer test. Within this cohort, we compared 25 patients with a history of MI and 40 controls (no smoking, no hypertension, no diabetes, no history of CAD, normal scintigram). Plasma was collected before and 30 min after exercise. IL-6 was determined by proximity extension or Luminex assays.

Results

A significant increase in IL-6 was observed in post-MI patients performing submaximal test, p=0.02, and also in post-MI patients performing maximal test (p=0.02) while no increase in IL-6 was seen in controls (p=0.63). Overall, 77 % of patients with prior MI and 38 % of controls exhibited an exercise-induced increase in IL-6 (p=0.002). Baseline levels of IL-6 were similar in post-MI patients and controls, 2.9 (2.5-3.6) vs 3.2 (2.4-3.2) pg/mL. Maximal watt levels and cardiovascular responses were also similar in the two groups. Exercise-induced increase in IL-6 was associated with myocardial ischemia (p=0.03), but this was attenuated after adjustment for prior MI.

Conclusions

IL-6 response to acute physical exercise is common in patients with a history of MI, despite statin treatment and “normal” IL-6 levels at rest. The inflammatory response to stress may reflect a residual inflammatory risk. However, its prognostic significance remains to be confirmed in a larger sample.

1955-A-1901

Atrioventricular plane displacement in patients with pre-transcatheter aortic valve implantation measured with computed tomography

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Aortic stenosis (AS) is a common heart disease with high mortality if severe and left untreated. AS leads to left ventricular (LV) obstruction and pressure overload. Transcatheter aortic valve implantation (TAVI) replaces the stenotic valve with a prosthetic stent valve by catheter as an alternative to open heart surgery. Atrioventricular plane displacement (AVPD) is of prognostic value and can be measured with magnetic resonance imaging (MR) but has never been measured with iodine contrast-enhanced computed tomography (CT).

Aims: Primarily, a proof-of-concept study to investigate if AVPD can be assessed with CT in patients with AS prior to TAVI procedure. Secondary, to investigate if the slice thickness is of relevance for the measurements of LV.

Methods: Patients examined with time resolution CT for preprocedural TAVI sizing of the stent valve and with informed consent were included. The regional ethical committee of Lund had approved usage of data. Image analyzes were performed using Segment CT (Medviso, Lund) in 3 mm and 5 mm slice thickness. End-systolic (ES) and end-diastolic (ED) LV dimensions mass (LVM), ES (ESV), ED (EDV), stroke volumes (SV), ejection fraction (EF) and atrioventricular (AV) plane were delineated and computed. LV longitudinal contribution was computed from AVPD and SV.

Results: Seven patients with severe AS (80 [interquartile range: 5] years, 3 women; Table 1) were analyzed. LV dimensions, except LVM, and LV longitudinal contribution did not differ between slice thickness (Table 2). 3 and 5mm values for LV dimensions and LV longitudinal contribution correlated well for all measures and had low biases (Table 3).

Conclusion: To conclude, AVPD is feasible to be measured in iodine contrast enhanced CT images in patients with severe AS prior to TAVI procedure. 3mm versus 5mm slice thickness values do not differ. Hence, for the sake of time consumption 5mm is recommended.

1957-A-1901

Atrioventricular Junction of the human adult heart harbours cells expressing stem cell-, hypoxia-, proliferation- and migration- biomarkers

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A stem cell niche is a microenvironment where the stem cells reside and are protected in a quiescent state, until activated. In a previous rat model, using DNA labeling, we observed a distinct region in the Atrio-Ventricular junction (AVj) with features of a stem cell niche. Whether a similar niche also exist in the adult human heart is not known.

AVj and Left Ventricle (LV) biopsies were collected from explanted hearts of organ donors, not used for transplantation (N=7) and from patients undergoing heart transplantation (N=7). Using antibodies we investigated the expression of stem cell-, hypoxia- and proliferation- biomarkers. In the AVj of donor hearts, stem cell markers; MDR1, SSEA4, Isl1, WT1 and hypoxia marker HIF1α were detected. The expression gradually decreased with distance from AVj. Co-staining of the proliferation marker Ki67, cardiomyocyte nuclei PCM1 and cardiac Troponin-T (cTnT) was observed. cTnT staining showed different sizes of cardiomyocytes. This was not seen in LV or in failing hearts.

In conclusion, we found an anatomic site in the human hearts, with features of a stem cell niche that coincides with the same region previously found in rats. Here densely packed stem cells, signs of hypoxia and different stages of cardiomyocytes were found. The identification of a stem cell niche, in the human adult heart, is of great interest and an important step towards a better understanding of the basic concepts of cardiac regeneration.

1958-A-1901

Pre-existing isoprenaline-induced takotsubo-like cardiac stunning reduces infarct size and ventricular arrhythmias after coronary artery ligation in the rat

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Background: Takotsubo syndrome (TS) is an acute cardiac affliction which is characterized by widespread left ventricular stunning-like akinesia, and which is clinically indistingiushable from acute myocardial infarction (AMI). Despite the fact that left ventricular dysfunction is often more widespread in TS than in AMI, the prognosis is better for TS than AMI. We have therefore proposed that TS is a more favorable form of myocardial stunning than AMI, and further hypothesize that pre-existing TS may reduce infarct size in the setting of AMI.

Methods: Seven-week old male Sprague Dawley rats were randomized to either TS-induction by and i.p. injection of isoprenaline or i.p. injection of saline. A myocardial infarction was subsequently induced by ligation of the left anterior descending coronary artery for 60 minutes, followed by 120 minutes of reperfusion. The primary endpoint was infarct size, as determined by triphenyltetrazolium chloride (TTC) staining. The secondary endpoint was the arrhythmia score at 120 minutes.

Results: Among 48 rats randomized to saline (control) or ISO-induced takotsubo-like stunning (takotsubo) prior to 60 minutes of ischemia followed by 120 minutes reperfusion the takotsubo group developed smaller infarcts (Figure). TS rats (N=16) were less likely to develop malignant arrhythmias than control rats (N=16) (median arrhythmia score 0 vs 2, $p<0.001$).

Conclusions: Pre-existing isoprenaline-induced TS-like stunning reduces infarct size, and reduces the amount of ventricular arrhythmias, after left anterior coronary artery ligation in rats.

1959-A-1901

Degree of change in pressure gradient of the tricuspid regurgitation associated with lighter exercise

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Background: The majority of pulmonary pathology causes increased pulmonary pressure. Increased heart rate may generate symptoms such as exhaustion and shortness of breath which can be signs of pulmonary hypertension. Some patients being referred for an echocardiographic examination have anamnesis of dyspnea or cardiac symptoms related to effort. The aim of the present study was to analyze tricuspid valvular function in rest compared to exercise in patients experiencing symptoms at effort and examine whether or not tricuspid regurgitation and pressure gradient over the tricuspid valve will alter immediately after exercise.

Methods: Sixteen participants, whereof ten with effort symptoms, were included with anamnesis of dyspnea or cardiac symptoms related to effort as well as findings of tricuspid regurgitation during the echocardiographic examination. After the examination, included individuals performed a bicycle test for six minutes with light workload (50 W). Additional ultrasound images of the heart was acquired immediately after finished bicycle test.

Results: Two variables, pressure gradient over the tricuspid valve before and after exercise, were analyzed according to its difference (figure 1). Median values of the variables were compared using Wilcoxon's signed-rank test and showed significant statistical difference ($p = <0.001$) for all participants and ($p = <0.01$) with anamnesis of cardiac symptoms related to effort. Spearman's rank correlation was used to analyze the relationship between increasing heart rate and pressure gradient under the influence of exercise and this test showed significant statistical difference ($p = <0.05$) for all participants and ($p = >0.05$) with anamnesis.

Conclusions: This study has shown that the pressure gradient of the tricuspid regurgitation changes in the performance of light exercise in individuals with history of dyspnea or cardiac symptoms related to effort. It also showed the value of an exercise test in adherence to the echocardiographic examination in this group of individuals.

1960-A-1901

Regional differences in incidence and mortality in patients with acute ischemic heart failure

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Background: Acute ischemic heart failure (AIHF) is the most common cause of death for patients with ST-elevation myocardial infarction (STEMI). The risk of AIHF in STEMI has been linked to factors such as choice of reperfusion strategy and time to reperfusion, and other patient-related factors that could theoretically differ between rural versus urban areas. We assessed whether the incidence and prognostic impact of AIHF in STEMI differ across the different health care regions in Sweden.

Methods: Using the nationwide Swedish Angiography and Angioplasty Registry (SCAAR) we identified patients who underwent primary PCI due to STEMI in Sweden between January 2010 and April 2018. Patients were grouped according to which of the six the health care region they were treated in. We defined IAHF as Killip class ≥2 and cardiogenic shock (CS), the most severe form of AIHF, as Killip class 4. The primary endpoint was mortality at 30 days.

Results: We identified 40,701 patients who underwent primary PCI during the study period with known vital status at 30 days, for whom Killip class was reported for 40,365 (99.2%). The highest number of patients were treated in the Western region (N=10,741 [26.6%]), followed by South (7,905 [19.6%]), Stockholm (6,505 [16.1%]), Northern (5,991 [14.8%]), Uppsala-Örebro (5,713 [14.2%]) and South-East (3,510 [19.6%). AIHF and CS incidences were highest in Stockholm and lowest in the South, whereas prognosis for patients with AIHF and CS was most favorable in Stockholm and least favorable in the South (Figure).

Conclusions: The incidence and prognosis of AIHF among patients with STEMI vary across health care region, with the lowest incidence and worst prognosis in the South and the highest incidence and best prognosis in Stockholm. These findings could be explained by less severely compromised patients being diagnosed with AIHF in Stockholm compared to the South.

1961-A-1901

Changes in left and right ventricular longitudinal function after pulmonary valve replacement in patients with Tetralogy of Fallot

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Background

New functional measures are needed to guide therapy and indicate treatment success of pulmonary valve replacement (PVR) in patients with Tetralogy of Fallot and pulmonary regurgitation (ToF-PR). Atrioventricular plane displacement (AVPD) and Global longitudinal strain (GLS) are two measures of longitudinal function (1), but is not known if they are interchangeable in ToF-PR. Therefore, we aimed to demonstrate how AVPD and GLS in the left (LV) and right ventricle (RV) is affected by PVR.

Material and methods

Thirteen patients with ToF-PR undergoing PVR were examined with CMR before PVR and 1 year after (Table 1). Fifteen healthy controls underwent CMR for comparison. Three long axis views were used to measure GLS, using feature tracking, and quantify AVPD for LV (2). For RV 3 and 4-chamber views were used for AVPD and the 4-chamber view for GLS. AVPD was calculated in absolute distance (mm) and as percentage of the ventricle length (AVPD%).

Results

Patients with ToF-PR had enlarged RV volumes , and decreased ejection fraction compared to controls. RV volumes decreased but did not normalize and EF remained decreased after PVR (Table 1).

RVAVPD and RVAVPD% was decreased in patients with ToF-PR compared to controls and decreased even more after PVR (Figure 1). RV strain in patients showed similar patterns (Figure 2). Preoperative LVAVPD and LVAVPD% in patients with ToF-PR did not differ from controls, decreased after PVR (Figure 1). LV strain did not differ in patients compared to controls (Figure 2).

Conclusion

Longitudinal function is affected in patients with ToF-PR when measured with AV-plane displacement on both sides, but strain showed pathology only in the RV compared to controls. Further studies are needed to show if longitudinal movement improves at long time follow up.

1962-A-1901

Predictors of patient decision time in ST-elevation myocardial infarction – data from an observational cross-sectional survey study

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Background: A short time from symptom onset until reperfusion is imperative in ST-elevation myocardial infarction (STEMI). When suffering from symptoms indicative of MI, people are encouraged to seek care via emergency medical service (EMS) within 15-20 min. Whereas system delay has been successfully shortened, patients delay has had a less favorable development. The aim of this study was to find out clinical, contextual, psychological and cognitive factors associated with decision time in STEMI.

Method: SymTime was a multicenter observational cross-sectional self-reported survey study performed at 5 Swedish hospitals chosen to represent geographic diversity, aiming to include consecutive STEMI patients during one year. A previously validated questionnaire on symptoms, thoughts and actions in the early phase of MI was filled in within 24 h from admission. Hemodynamically stable STEMI patients understanding Swedish were eligible. Early action was defined as decision to seek care <20 min, whereas late action was defined as a decision to seek care >90 min.

Results: In total, 532 patients where included. Among those 19.5% called EMS as first medical contact (FMC) within 20 min, whereas 10.7% acted within 20 min, but did not call EMS as FMC. Twenty-eight % called EMS as FMC, but delayed >20 min, and 41.7% neither acted promptly, nor called EMS as FMC. Factors associated with decision time are presented in Table 1.

Conclusion: Surprisingly, no specific symptom or severity of symptom were associated with short delay, neither age nor gender. Instead correct interpretation of symptoms and prompt actions of bystanders were factors associated with short decision time. Frightening symptoms such as diaphoresis was negatively associated with long decision time, as well as female gender and getting diseased off hours. In order to design successful interventions it is important to gain a better understanding about why patients hesitate to seek care.

1964-A-1901

Adapting to a new life situation through guidance to achieve well-being when afflicted by takotsubo syndrome

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Background

Takotsubo syndrome (TS) is an acute and reversible type of heart failure that shares common features with acute coronary syndrome. It is usually caused by psychological or physical stress. Residual symptoms and decreased mental health in the recovery phase is common. Furthermore, patients struggle to comprehend and manage their every-day living.

Aim

To describe patients experiences when afflicted by takotsubo syndrome, after discharge from the hospital.

Method

An inductive explorative design using a qualitative approach was used. Based on criterion sampling, patients diagnosed with TS were asked to participate in semi-structured individual interviews. The transcribed text was analyzed using a qualitative content analysis with a latent approach.

Results

Ten women and one man, aged 33-85 years, were interviewed 2-12 months after discharge. Two manifest categories were identified: process from onset to recovery and changes in life conditions, and also a main theme were conceptualized: adapting to a new life situation through guidance to achieve well-being. Patients experienced a process that involves seeking answers and they suffered from emotional reactions. Though, during the interviews varying emotional reactions emerged. They expressed that more support was desired from the health care professionals such as an earlier appointment for follow-up and a nurse to contact about e.g. residual symptoms.

Conclusion

Being afflicted by TS can lead to change in life conditions to a great extent but varies between patients. The follow-up care needs to improve as the patients need more guidance from the health-care professionals after discharge. A structural and multi-professional treatment with a person-centered approach would support patients in their recovery and could improve their well-being. But there is still a need of more research regarding patient-counselling and follow-up structure in patients with TS.

1965-A-1901

Cardiovascular risk factors associated with a low carbohydrate high fat diet

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BACKGROUND

Low carbohydrate diets have been around for decades. In Sweden, the low carbohydrate high fat (LCHF) diet gained popularity around 2006. LCHF has shown short term positive effects in overweight and diabetic patients. Knowledge of how a LCHF diet can be composed and its effects on cardiovascular risk factors is low. The aim was to evaluate the nutritional composition of a population of self-reported adherence to a LCHF diet and assess effects of macronutrient composition on cardiovascular risk factors in this group.

METHODS

A cross sectional study of 100 adult volunteers eating LCHF for at least 3 months was conducted. The participants were weighed, measured and blood was drawn. They received an activity monitor to evaluate basal energy expenditure. A diet history interview was conducted to assess nutritional intake.

RESULTS

Mean total energy intake was 2097 kcal. The mean percentage of total energy intake (E%) from carbohydrates was 9,1E%, from fats 71,1E% and from protein 16,8E%. LDL was 3,9, HDL was 1,98, triglycerides 0,88 and total cholesterol 6,3 on average. For baseline characteristics see table.

No association between levels of carbohydrate intake and risk factors was shown. A higher protein intake was associated with lower HDL and higher triglycerides. A higher intake of fat was associated with lower triglyceride levels.

Larger ratio of dietary cholesterol to total fats consumed was associated with higher LDL and total cholesterol levels.

Higher alcohol intake was associated with higher systolic blood pressure.

CONCLUSIONS

The average carbohydrate intake level was below what is generally considered ketogenic (<10E%). Overall, the lipid profile shows slightly elevated total cholesterol and LDL but low triglycerides and high HDL. Dietary cholesterol was the only macronutrient associated with alterations in lipid profile.

1966-A-1901

Aged Garlic Extract reduce the coronary atherosclerotic progression in a double-blind randomized placebo-controlled trial

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Background: Aged Garlic Extract (AGE) has in previous studies shown a positive effect on blood pressure, inflammatory biomarkers and a cholesterol lowering effect in a US population. The present study was designed to evaluate whether AGE can influence the rate of atherosclerosis plaque burden measured by coronary artery calcium score (CAC), and favorably change biomarkers of oxidative stress in a Scandinavian population.

Method: The participants (n= 96) were assigned to AGE (2400 mg daily) or placebo for 1year treatment in a double-blinded manner, and the study was monitored by an external monitor during the whole study. Participants between 40-75 years with Framingham Risk Score ≥ 10, and with a positive CAC finding were included. Participants with concomitant medications had to have a stable medication for at least 12 weeks prior to randomization. CAC was measured at 0 months and after 12 months of either placebo or AGE treatment using coronary computed tomography calcium scan (Cardiac CT). CAC was defined as plaque with a density of >130 Hounsfield units. The lesion score was calculated using Agatston score system. CAC progression was defined as an increase in CAC > 15% per year. Inflammatory biomarkers and blood lipids were measured at 0, 4, 8 and 12 months.

Results: A logistic regression analyses studying CAC score showed a statistically significant positive effect with less progression of CAC score in the AGE group. Il-6 was significantly lower ($p<0.05$) at time 12 moths in the AGE group compared to the placebo group. The analyses were adjusted for demographics, age, gender, and traditional cardiac risk factors.

Conclusions: AGE reduces CAC progression and lowers inflammatory markers (IL-6). We believe that AGE slows down the progression of cardiovascular disease.

1967-A-1901

Estimating potential health consequences of different implementation patterns of ticagrelor

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Background

Not using effective treatments may result in suboptimal health outcomes. The aim of this work was to describe and quantify the potential health consequences of different implementation patterns for ticagrelor.

Methods

The number of patients aged <80 years with a myocardial infarction (MI) and treated in an acute cardiac care unit between 2011 and 2015 was identified in SWEDEHEART. Each year, the proportion of patients treated with ticagrelor was identified for each county council (CC). We estimated the number of additional patients that would have been treated under some alternative implementation scenarios: 1) all CCs implementing ticagrelor to the level of the CC with the highest level; 2) all CCs achieving 2015 implementation levels from the start of implementation; and 3) implementation starting at 6 months, rather than 12 months, after ticagrelor approval by the EMA. The health implication of treating additional patients was estimated in terms of MI, stroke, cardiovascular death and quality-adjusted life years.

Results

Of the 65,672 MI patients identified in SWEDEHEART, 29,318 (44.6%) received ticagrelor. Implementation levels varied significantly across CCs and an additional 10,550 patients would have been treated with ticagrelor if all CCs had implemented ticagrelor to the same level as the CC with the highest implementation. It was estimated that such implementation could have prevented 116 MIs and 116 cardiovascular deaths, while an additional 21 strokes may have occurred. The estimated long term health implications was a loss of 1,371 years in full health.

Furthermore, 5,727 and 4,382 additional patients would have been treated with ticagrelor if achieving the 2015 implementation level from 2012, and achieving earlier implementation, respectively.

Conclusions

There may be significant health losses associated with low and varying implementation, demonstrating considerable value in ensuring appropriate and equal implementation of effective cardiovascular treatments across county councils and countries.

1969-A-1901

A gender perspective on incidence, management, short- and long term outcome of cardiogenic shock complicating ST-elevation myocardial infarction – a report from the SWEDEHEART register

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Background

Cardiogenic shock [CS] is a severe complication of ST-elevation myocardial infarction [STEMI]. An increased use of primary percutaneous coronary intervention [PPCI] has been associated with a decline in CS incidence, and a better prognosis. Female gender has been associated with a worse prognosis in STEMI, but whether there is a gender difference in incidence and outcome of CS complicating STEMI is not known. The objectives of this study were to compare the genders regarding incidence, management, and prognosis of CS complicating STEMI.

Methods

Patients with STEMI and CS were identified in SWEDEHEART 2005-2014. Cardiogenic shock was defined as any of; 1) systolic blood pressure [BP] <90 mm Hg ≥30 min, 2) signs of tissue hypoperfusion, 3) cardiac index <1,8 l/min/m2, 4) ionotropic drugs and/or need of intra-aortic balloon pump. Multiple logistic and cox regression analyses were done with reperfusion therapy, in-hospital and 1-year mortality as dependent variables.

Results

Among 56072 STEMI patients 3134 CS cases were identified. Women more often than men developed CS (6.3 vs 5.2%, p<0.001). The age-adjusted incidence of CS did not change in women, whereas in men the incidence increased by 2.7% yearly. Women had a less chance of receiving reperfusion therapy, OR 0.77 (95% CI 0.65-0.92), but had neither higher in-hospital mortality (OR 1.01, 95% CI 0.85-1.19), nor higher 1-year mortality (OR 0.97, 95% CI 0.70-1.33). Upon age stratification the gender difference in reperfusion was only evident among the oldest (>80 years).

Conclusion

Women had higher risk of CS than men when stricken by STEMI, but whereas CS incidence increased in men it was stable in women. Although women had less likelihood of receiving reperfusion therapy, adjusted in-hospital, and 1-year mortality was without any gender difference. The rate of reperfusion was especially low in elderly women, where there seems to be room for improvement.

1973-A-1901

Sex differences in clinical outcomes in the takotsubo syndrome versus acute myocardial infarction

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Background: Takotsubo syndrome (TS) is an acute cardiac syndrome with a clinical presentation very similar to acute myocardial infarction (AMI). One striking feature that distinguishes TS from AMI is that approximately 90% of TS patients are women. However, even though women are more often affected by TS, men that develop TS have been reported to have worse outcomes than women with TS. We sought to compare men and women with TS, and contrast the observed sex differences in TS and AMI.

Methods: Using the nationwide Swedish Angiography and Angioplasty Registry (SCAAR) we identified almost all (n=117,720) patients who underwent coronary angiography due to TS (N=2,898 [2.5%]), STEMI (N=48,493 [41.2%]) or NSTEMI (N=66,329 [56.3%]) in Sweden between January 2009 and February 2018. We compared the association between sex and adverse clinical outcomes for patients with TS versus AMI.

Results: Patients with TS were more often women (73.0%) as compared with patients with STEMI (27.3%) or NSTEMI (30.0%), p<0.0001. A statistical interaction was present between TS and sex such that men with TS had an unadjusted risk of dying within 30 days that was more similar to that of men with STEMI, whereas women with TS had considerably better unadjusted 30-day prognosis than did women with STEMI (Table). However, after multivariable adjustment, the statistical interaction with regards to mortality risk between sex and TS versus AMI did not persist (Table).

Conclusion: As compared to sex-related differences in prognosis after AMI, men with TS have disproportionally worse prognosis than women with TS. Some of the TS-specific sex-related risk may be related to other cardiovascular risk factors and comorbidities.

1974-A-1901

Staphylococcus aureus bacteremia in patients with cardiac implantable electronic devices

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Background: Previous studies have reported a prevalence of 34-45 % for Cardiac Implantable Electronic Device (CIED) associated infection among patients with S. aureus bacteremia (SAB). Due to poor outcome with conservative treatment, diagnostic difficulties, and high prevalence of CIED infection with SAB, recent Swedish guidelines advocate CIED extraction in all subjects with SAB, if possible. The aim of this study was to investigate the clinical course of SAB in patients with CIED.

Method: All subjects with SAB and concomitant CIED in Västmanland during 2009-2016 were retrospectively reviewed. Pocket infections were excluded. Data on clinical course and outcome (death or relapse in SAB within 90 days) were collected.

Results: We identified 46 cases of SAB in patients with concomitant CIED. Fourteen subjects (30%) died during hospitalisation. The possibility of CIED infection was considered in 15 patients (33%). Echocardiography was performed in 31 patients (67%). Five subjects (11%) were examined transoesophageally. Clinical diagnosis of CIED associated infection was established in 7 subjects (15%) and CIED was extracted in 5 (11%). No deaths or SAB relapse was seen after extraction. Among discharged patients managed conservatively (n=27) 5 patients died of causes unrelated to SAB, 19 had an uneventful follow-up, and 3 patients had SAB relapse, where one case was fatal.

Conclusions: The awareness of possible CIED infection was low and transoesophageal echocardiography and CIED extractions were infrequent. The prevalence of CIED-associated infection was lower, but the outcome similar, in our study compared to previous studies. The lower prevalence could be explained by underdiagnosis, differences between studied populations and/or overdiagnosis in previous studies. Results should be interpreted with caution due to a limited sample size, but the low relapse rate among conservatively managed patients suggests that an individual risk/benefit-analysis might be preferable to an “extraction for all”-policy in these elderly and diseased patients.

2001-A-1901

Atrioventricular coupling before and after pulmonary valve replacement in patients with Tetralogy of Fallot.

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Background

New functional measures are needed to guide therapy and indicate treatment success of pulmonary valve replacement (PVR) in patients with repaired Tetralogy of Fallot (rToF) and pulmonary regurgitation (PR). To understand changes in pumping after PVR in patients with rToF and PR, we aimed to investigate how right ventricular (RV) longitudinal function correlates with atrial filling and if it differs between patients and healthy controls and if changes occur after PVR.

Methods

Ten patients with rToF and PR >35% underwent CMR before and 1 year after PVR. Fifteen healthy volunteers acted controls. 3- and 4-chamber views were used to quantify RV atrioventricular plane displacement (AVPD). Tricuspid plane displacement (TPD) contribution to stroke volume (SV) was calculated as RVAVPD multiplied with the right atrial end-systolic area above the AV-plane.

Results

Caval venous return occurred to a lower extent during systole in patients, 44±18% of the total SV, compared to controls, 63±9%, p=0.0015, and was not affected by PVR, 41±19%, p=0.95. Systolic caval blood flow correlated with atrial volume change before PVR, r=0.83; p=0.0049, after PVR, r=0.93; p=0.0007 and for controls, r=0.94; p<0.0001. Systolic right atrial volume change correlated with TPD contribution to SV before PVR and in controls, but no correlation was found after PVR, Figure 1. TPD contribution to SV, was lower in patients with rToF and did not change after PVR, Figure 1.

Conclusion

Patients with rToF and PR had reduced atrial reservoir function and elevated conduit function before and after PVR compared to controls. Atrioventricular coupling was impaired after PVR. RV longitudinal contribution to SV was lower in patients before PVR and did not normalize within a year after PVR. Further studies are needed to investigate the reason for the impaired atrioventricular coupling after PVR and to see if longitudinal function improves at long time follow up.

2002-A-1901

Prognostic impact of PCI in octogenarians with non-ST elevation myocardial infarction: A report from SWEDEHEART

Sebastian Völz

Background: Studies have shown that percutaneous coronary intervention (PCI) improves morbidity and mortality in non-ST elevation acute coronary syndromes (NSTE-ACS). Octogenarians, however, were underrepresented in these trials and the optimal treatment strategy remains a subject of debate. This study aimed to assess the effect of PCI in patients ≥ 80 years during the first year of follow–up.

Methods: We used data from the SWEDEHEART registry for all hospital admissions at eight cardiac care centers within Västra Götaland County. The database contains >100 clinical variables documenting the entire process of acute coronary hospital care. All consecutive patients ≥ 80 years, admitted for NSTE-ACS during the period January 2000-December 2011 were included in the analysis. We performed instrumental variable analysis with propensity score to adjust for measured and unmeasured confounders. Treatment preference variable was the calendar year. The primary endpoint was all-cause mortality at 30 days and one-year after index hospitalization.

Results: During the study period a total of 5200 patients fulfilled the inclusion criteria. The number of patients ≥ 80 years treated with PCI increased by 2,2 % per calendar year between 2001 and 2011. In total, 586 (11.2%) patients underwent PCI; the remaining 4614 patients were treated conservatively. Total mortality at 30 days post PCI was 19.4 % (1,007 events) and 39.4 % (1,876 events) at one-year. 30-days mortality was 20.7 % in the conservatively treated patients and 8.5% in the PCI treated patients (adjusted OR 0.34; 95% CI 0.12-0.97, p = 0.044). One-year mortality was 42.1 % in the conservatively group and 16.3% in the PCI group (adjusted OR 0.97; 95% CI 0.36-2.51, p = 0.847)

Conclusion: In this observational study, treatment with PCI in octogenarians with NSTE-ACS was associated with a lower risk of mortality at 30 days. However, this short-term survival benefit was not sustained one year after the index hospitalization.

2004-A-1901

VITAMINS AND ANTI-OXIDANTS CAN INFLUENCE ARTERIAL STIFFNESS

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Abstract:

BACKGROUND. Arterial stiffness has functional and anatomic causes. Functionally, stiffness is dependent on level of blood pressure and endothelial function. This presentation describes effects of vitamins and anti-oxidants in healthy persons of age 53 - 74 (mean 65) years with low CVD SCORE risk.

METHOD. 29 women and 3 men attended health lectures and opted to start treatment for 6 months with vitamins, anti-oxidants, mineral supplements and omega-3 capsules. General dietary advice and recommendation to regular physical exertion was given. Before, and after 3 and 6 months' treatment, pulse wave velocity (PWV) and augmentation index (AIX) were determined using Arteriograph™. Seventeen persons, 13 of whom were responders (RSP) at 6 months, had a follow-up after mean 27 (14-44) months. RSP were defined as decrease of >1 m/s PWV and/or >10 units AIX. One* is $p < 0,05$, two** is $p < 0,01$ by corrected paired t-test.

RESULTS. At 6 months, PWV decreased from 10,0 to 9,2**, AIX decreased from 9,9 to -1,4* percent units, and aortic systolic BP decreased from 140 to 131* mmHg. 23 persons. Altogether 23 persons (72 percent) of participants had significant improvements of stiffness variables ($p<0,05$). Only two had significant worsening of PWV and AIX. At 27 months' follow-up without treatment, average values were not different from baseline, but 7/13 (54 percent) still fulfilled the criteria for R.

CONCLUSION. Although this is an open study, the results demonstrate that intake of vitamins and anti-oxidants are followed by improved arterial stiffness variables in 23 of 32 persons. The response remained after 27 months with free cost regimen in 54 percent of persons. PWV is a strong risk factor for CVD. Adding this variable to SCORE assessment improved risk percentages in five participants from (median) 3 to 14. Stiffness variables are recommended for use in management of CVD.

2005-A-1901

A novel clearance mechanism for cardiac troponin between muscle cells

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Background:

Cardiac troponins (cTn) troponin T (cTnT) and troponin I (cTnI) are released into the circulation following cardiac damage and are transiently elevated in blood samples following myocardial infarction (MI). Stable cTn elevations without obvious connection to cardiac injury, possibly by impaired clearance, are linked to substantially higher mortality compared to patients with cTn elevations due to MI. Here we describe a novel cTn clearance mechanism between muscle cells that might be involved.

Methods:

Clearance of cTnT following i.v. or i.m injection of cTn were measured in rats. Endocytosis of cTn by cardiac cells were measured.

Results:

Following i.m. injection of rat cTn 4-12% of the cTnT and 0,2-4% of cTnI reached circulation compared to i.v. injection. Similar pattern was observed by fluorescently labeled dextran in the circulation, known to be efficiently endocytosed by muscle cells whereas FITC-sinestrin, a small molecule was quantitatively recovered after i.v. or i.m. injection, as expected. Fluorescently labeled pig cTn complex was taken up locally by the muscle cells and was still detected after 24h in the injection area. After i.v. injection of F18-labeled cTn complex 68% of the injected cTn was retained in the liver by PET analysis. In contrast, after i.m. injection no cTn was found in the liver, apparently because little intact cTn was released into the circulation. Neonatal rat cardiomyocytes internalized fluorescently labeled pig cTn by endocytosis.

Conclusion:

We demonstrate for the first time a strong clearance of cTn between muscle cells.

It is likely that similar clearance occurs in cardiac muscle and in other extracellular spaces in the body. Impeded clearance between cells could explain stable elevation of cTn and other cell damage biomarkers.

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A possible mechanism behind faster clearance and higher levels of cardiac troponin I compared to troponin T in patients with acute myocardial infarction

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Background:

Although there are similar amounts of cardiac troponin I (cTnI) and troponin T (cTnT) in human myocardium peak cTnI levels are over tenfold higher and are cleared faster compared to cTnT in patients with acute myocardial infarction (MI).

Objective:

To compare the overall clearance of cTnT and cTnI in rats. To compare kidney dependent clearance of cTnT and cTnI in patients. To compare the release of cTnT and cTnI from damaged human cardiac tissue.

Methods:

Grounded rat heart tissue/extracts was injected intra venous or intra muscular (quadriceps) in rats to simulate myocardial damage with a defined onset.

cTnT and cTnI were measured in paired blood samples from the renal vein and radial artery in 6 heart failure patients undergoing renal vessel catheterization. From these measurements the renal extraction index was calculated

Results:

TnT and cTnI peaked at the same time after injection, but peak cTnI levels were three times higher and returned to baseline levels after 54 hours compared to cTnT that returned to normal after 168 hours, a similar pattern as observed after MI in humans. There was no difference in the rate of clearance of cTnT or cTnI after i.v. Injection in rats with or without clamped renal arteries or after i. m. injection of rat heart plasma extracts. Kidney clearance of cTnT and cTnI was similar in 6 heart failure patients. The release of cTnI was faster and reached a tenfold higher level when damaged human cardiac tissue was incubated in warm plasma. Most of the released TnI were in monomeric form whereas most cTnT had a molecular weight indicating that it was in complex with cTnI.

Conclusion:

The reason that cTnI reach higher peak levels and is cleared faster compared to cTnT likely reflects its weaker binding to insoluble thin filaments in necrotic cardiac tissue.

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Real-time phase-contrast CMR for cardiac output measurements in athletes and patients

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Background: Electrocardiogram (ECG) gated phase-contrast (PC) cardiovascular magnetic resonance (CMR) is a clinically applied method for quantifying blood flow. In patients suffering from arrhythmia the ECG signal is often corrupted and cannot be used to trigger the scanner. A continuous real-time (RT) sequence could potentially circumvent this limitation. The aim of this study was to validate RT PC-CMR by comparing cardiac output (CO) measured from the ascending aorta and pulmonary trunk in athletes and aortic flow in non-arrhythmic patients to conventional ECG-gated PC-CMR.

Methods: A prototype sequence for non-gated RT flow measurements using segmented-EPI acquisition was used with the following parameters: TE/TR/α, 5.3ms/10ms/15°, reconstructed temporal resolution 40 ms, spatial resolution 2.7x2.7x10 mm and VENC 200 cm/s. Images were acquired during five seconds in free breathing.

For ECG-gated flow, a PC sequence with gradient echo acquisition with the following parameters was typically used: TE/TR/α, 2.7ms/4.9ms/20°, reconstructed temporal resolution 30 ms, spatial resolution 1.6x1.6x5 mm and VENC 200cm/s, 1 averages. Images were acquired during 3-5 minutes in free breathing.

CMR images of eighteen athletes were acquired on a 1.5 T MAGNETOM Aera (Siemens, Erlangen, Germany). Five non-arrhythmic patients with both ECG-gated and RT PC images of the ascending aorta were retrospectively included. Measurements were done using Segment (http://medviso.com).

Results: For the ascending aorta, RT images for two athletes were not acquired. For the pulmonary trunk, RT images were not acquired for seven athletes and the quality of RT images for two additional athletes was too low for analysis. The difference of measured CO between RT PC images and ECG-gated PC images was -0.36±0.67 l/min (mean±SD) (Figure 1).

Conclusions: Real-time phase-contrast showed a small (~7%) overestimation of CO when compared to ECG-gated phase-contrast. Considering the very fast acquisition with RT PC for 5 seconds the low bias suggests a high clinical utility.

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Seasonal variation in takotsubo syndrome compared with myocardial infarction in Sweden: A report from the Swedish Angiography and Angioplasty Registry

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AIM: Acute myocardial infarction (MI) shows well-defined temporal patterns in occurrence throughout the year characterized by a peak in winter and a trough in summer. Takotsubo syndrome (TS) is a potentially life-threatening acute cardiac syndrome with a clinical presentation very similar to myocardial infarction (MI) and for which the natural history, management and outcome remain incompletely understood. The aim of this study was to evaluate whether incidence of TS varies throughout the year in Sweden.

METHODS AND RESULTS: Using the nationwide Swedish Angiography and Angioplasty Registry (SCAAR) we identified almost all (n=153,400) patients who underwent coronary angiography due to TS (N= 2,673 [1.7%]), STEMI (N= 42,744 [27.7%]) or UA/NSTEMI (N=108,688 [70.5%]) in Sweden between January 2009 and February 2018. Patients with TS were more often women as compared with patients with STEMI or UA/NSTEMI. We calculated the number of cases of TS, STEMI, UA/NSTEMI per month and used Edwards test to evaluate whether occurrence of events differs throughout the year. The onset of TS differed as a function of season ($p<0.001$), with the events most frequent in winter (n= 696, 26.1%) and least in spring (n=625, 23.4%). The incidence of STEMI and UA/NSTEMI also varied by season (both $p<0.001$), with highest events in winter [(STEMI, n= 21,489, 26.7%) (UA/NSTEMI, n= 57,696, 26.5%)] and lowest in summer [(STEMI, n= 18,536, 23.0%) (UA/NSTEMI, n= 50,535, 23.2%)].

CONCLUSIONS: In Sweden, the pattern of seasonal variation in TS is similar to STEMI and UA/NSTEMI with peaks during winter. While the lowest incidence of TS was during spring, the incidence of STEMI and UA/NSTEMI was lowest during summer.