Evolution over time of antithrombotic therapies in patients with newly diagnosed atrial fibrillation: data from the GARFIELD-AF registry.

Methods: GARFIELD-AF is an ongoing, international, prospective, observational study of consecutively recruited adults (≥ 18 years with newly-diagnosed ≥ 15 days without prior anticoagulation) from 109 centers in 13 countries (Europe, Canada, Asia, Middle East). Belgium entered the study in cohort 2. Recruitment in cohorts 2 (June 2012-June 2013), 3 (July 2013-July 2014) and 4 (August 2014-July 2015) has now been completed: 403, 515 and 427 pts. were included respectively. Antithrombotic therapies that were initiated were analyzed per cohort.

Results: At this time, baseline results are available for all 403 and 515 cohort 2 and 3 pts., as well as 384 of the 427 cohort 4 pts.
satisfactory, i.e., CHA2DS2-VASc score ≤ 1. For patients undergoing chronic anti-arrhythmic therapy, the need for anti-arrhythmic drug therapy was as follows: after a presumed successful procedure, fraction of patients with CHA2DS2-VASc score ≥ 1. To obtain a beneficial clinical outcome multiple procedures are often needed with 15% of patients still on chronic anti-arrhythmic drug therapy.

Safety profile of atrial fibrillation ablation versus chronic anti-arrhythmic therapy in a comparison. — Yves De Greef, Bruno Schwagten, Dirk Stockman — ZNA Middelheim Hospital, ASZ Hospital Aalst.

Methods. — 1000 patients with symptomatic recurrent atrial fibrillation were included: 767 patients (77,4%, 82,9% and 86,7%) were on chronic anti-arrhythmic therapy (CHF, VKA ± AP vs NOAC ± AP vs AP only). Atrial fibrillation ablation was defined as any procedure-related adverse event occurring up to 1 month after ablation, a side-effect of amiodarone as any reason necessitating discontinuation.

Conclusions. — From 2012 to 2015, anticoagulation use across the 3 cohorts was 71,2%, 75,3% and 78,4% respectively in all pts. For the CHA2DS2-VASc score ≥ 2 pts, this was 77,4%, 82,9% and 86,7%.

Across the 3 cohorts, the use of Vitamin K antagonists (VKA) decreased (20,2%, 17,0%, 11,5%) and use of the 

Non-Vitamin-K-Anticoagulants (NOAC) increased (VKA ± AP 9,3%, 9,1% and 9,0%; NOAC ± AP 20,2%, 17,0% and 11,5% respectively in all pts. For the CHA2DS2-VASc ≥ 2 pts. this was 22,6%, 18,7%). Antiplatelet use decreased from 31,7% to 26,8% and 17,5% across the 3 cohorts.

26,8% and 17,5% across the 3 cohorts. The occurrence increased slightly over time (24,0%, 25,8%, 26,8%) and was more frequently from direct thrombin inhibitors (DTI – 16,2%, 20,4%, 20,9%). Antiplatelet use continued to decrease. The occurrence increased slightly over time (22,6%, 18,7%). Antiplatelet use decreased from 31,7% to 26,8% and 17,5% across the 3 cohorts.

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Belgian Society of Cardiology

Complications associated with conventional transvenous pacing systems are most often related to the pacing lead and pocket. We report the results of the first implantations of leadless cardiac pacemaker in our center.

Methods and results

From July to mid-September 2015, we implanted 3 patients having a Class I indication for VVI pacing with a Micra transcatheter pacing system (Medtronic, Minneapolis, USA), from the right femoral vein and fixated in the right ventricle using four protractible tines (Figure 1). The 3 patients were male, mean age 85 ± 4 years old. Primary indication for pacing was chronic atrial fibrillation with symptomatic pauses > 3 seconds and syncope. Implant success rate was 100% without need for repositioning of the device after first deployment. All procedures were performed under general anesthesia. Implant time was respectively 52, 45 and 40 minutes for the first, second and third procedure with a mean fluoroscopy time of 15 ± 4 min. The 3 devices were implanted at the RV apex. Access site closure was performed using a suture method (figure of eight stitch). No adverse events related to the procedure for the 3 patients were observed. The mean pacing capture threshold was 0.8 ± 0.2 V at 0.24 ms at implantation and was 0.56 ± 0.07 V at 0.24 ms after 1 month follow-up. Mean pacing impedance was respectively 540 ± 40 Ω and 530 ± 20 Ω at implantation and after 1 month. R-wave sensing amplitude was respectively 10.1 ± 6.2 mV and 12.3 ± 8.3 mV at implantation and after 1 month.

Conclusion

The first 3 implantations of a miniaturized leadless cardiac pacemaker (Micra Transcatheter device) were successful without complications. Implantation of this new device was safe and efficient with stable pacing parameters at 1 month. All procedures were performed under general anesthesia. Implant time was respectively 52, 45 and 40 minutes for the first, second and third procedure with a mean fluoroscopy time of 15 ± 4 min. The 3 devices were implanted at the RV apex. Access site closure was performed using a suture method (figure of eight stitch). No adverse events related to the procedure for the 3 patients were observed. The mean pacing capture threshold was 0.8 ± 0.2 V at 0.24 ms at implantation and was 0.56 ± 0.07 V at 0.24 ms after 1 month follow-up. Mean pacing impedance was respectively 540 ± 40 Ω and 530 ± 20 Ω at implantation and after 1 month. R-wave sensing amplitude was respectively 10.1 ± 6.2 mV and 12.3 ± 8.3 mV at implantation and after 1 month. We expect to have implanted > 10 devices by January 2016.

There were no post-procedural deaths. Adverse events could be classified into 2 groups:

(1) "ablation technique independent" mainly consisting of vascular injury (40%), pneumonia (4%), thromboembolic events (2%) (1 TI, 1 coronary embolization of left atrial thrombus after transseptal puncture), transient atrial fibrillation (5%) and syncope (5%);

(2) "ablation technique dependent" such as pericardial injury (33%), (3 tamponades, 3 pericarditis requiring NSAIDs and 'fluid' retention syndrome (6%) both mainly related to PV AC ablation, 1 acute kidney injury and 1 pulmonary vein stenosis (3%) mainly related to mitral valve ablation. Interruption of amiodarone therapy was necessary in 120 (38%) of 320 patients on amiodarone therapy before ablation. Reasons to interrupt were thyroid dysfunction (55%), dermal toxicity (22%), prolonged QT interval (15%), atrial fibrillation (10%) and intolerance (6%).

Conclusions

Although relatively frequent, the great majority of complications of AF ablation can be treated conservatively and only minor lead to permanent sequelae. Adverse events of AF ablation consist mainly of vascular and pericardial injury and are dependent on the ablation technique used. Although displaying a different safety profile, amiodarone has an absolute higher number of adverse events.

First Belgian experience with miniaturized leadless cardiac pacemakers (Micra Transcatheter device).— Christophe Garweg, J. ector, P. Haemers, G. Voros, R. Willems (Cardiology, University Hospitals of Leuven)

Aims

Cardiac pacing is the only effective treatment for symptomatic bradycardia that improves survival in high risk populations and reduces recurrence of syncope. First Belgian experience with miniaturized leadless cardiac pacemakers (Micra Transcatheter device).— Christophe Garweg, J. ector, P. Haemers, G. Voros, R. Willems (Cardiology, University Hospitals of Leuven)

Aims

Cardiac pacing is the only effective treatment for symptomatic bradycardia that improves survival in high risk populations and reduces recurrence of syncope.
Introduction

The main place for cryotherapy is in the ablation of persistent and paroxysmal atrial fibrillation commonly treated with oral anticoagulation. With the first generation of cryoablation catheters the outcome on addressing particularly paroxysmal patients is promising, and only occasionally persistent patients. However, our results to the previous patients were comparable to the persistant patients. As far as persistent cryoablation was concerned, it was concluded to supply cryoablation in a limited patient collective.

Methods and Results

Results and complications from the first 100 consecutive patients treated at our hospital were compared with the results of 100 patients treated in Houston, Texas in the year 2009.

Table 1

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<thead>
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<th>Type</th>
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<tr>
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Procedural parameters and complications are shown in table 2.

Conclusions

In a group of difficult patient of persistent atrial fibrillation, the 2nd generation cryoballoon was more effective than the first generation, with no need for touch-up procedures, and with a substantially lower number of complications. Radiation beam complications were not significant. In the case of persistent atrial fibrillation, the new generation cryoballoon was more effective and less traumatic.

Absence of ventricular tachycardia, no flow duration and low flow duration are the main determinants for outcome.

Analysis of 599 patients for out of hospital cardiac arrest survivors (OHCA):

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By using an algorithm including those 3 prehospital variables, we were able to predict correctly the 30-day outcome in 92.6%.

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Belgian Society of Cardiology

 structural abnormalities, as compared to 50 normal eCGs. TA was defined as the frontal plane axis of the terminal QRS activation at 20 ms before the end of the QRS and was visualized on a circular diagram.

Results

TA of ARVC patients has a distinct right-sided direction ($p$-value: < 0.0001), whereas TA of control patients and TA of patients with RVoT ectopy is equally distributed on a circular diagram. A right-sided orientated TA yields a sensitivity of 79% for the diagnosis of ARVC. Comparison of the mean direction of TA between patients with or without a known pathogenic mutation indicates no significant difference between the two groups ($p$-value: 0.462).

Conclusions

TA of ARVC patients is significantly directed right-sided towards the RV inflow and outflow tract, compatible to involvement of RV conduction delay in ARVC pathophysiology. In patients with benign RVoT ectopy, TA does not show this predilection. Determination of TA could be a useful additional criterium for the diagnosis of ARVC and the differentiation with benign RVoT ectopy.

First Belgian experience with the Endoscopic laser balloon Ablation System for pulmonary vein isolation. (Δ)

— Pieter Koopman1, Jeff ten Haken 2, Philippe Vanduynhoven1, Dagmara Dilling 1, Joris Schurmans1, Hein Heidbuchel1, Johan Vijgen1

(1Heart Center Hasselt, Jessa Hospital, Hasselt, Belgium, 2Cardiofocus Inc, Marlborough, USA)

Aims

Pulmonary vein isolation (PVI) is a common treatment option for patients with atrial fibrillation (AF). Conventional point-by-point radiofrequency ablation is time-consuming and requires periprocedural imaging using 3D mapping systems to reliably identify the pulmonary vein (PV) – left atrial (lA) junction. Current balloon technologies are confined to a single balloon size and a preset ablation design, do not offer variable energy modes, and require periprocedural contrast injections to identify the PV – lA junction. The novel endoscopic laser balloon ablation system (eAS) consists of a compliant, sizeable balloon and allows for direct endoscopic PV visualisation and guidance of energy delivery during PVI procedures, using a new energy source for ablation. The present study reports the feasibility and acute efficacy of the novel eAS for PVI in the first 34 patients treated in Belgium.

methods

34 patients (71% male, mean age 60 years) with AF (79% paroxysmal, 21% persistent) successfully underwent pulmonary vein isolation with the eAS in a 6.5 months period from December 2014 to July 2015. Two operators performed all procedures. A total of 132 PVs (4 patients with left common PV, 1 patient with an additional right middle PV) were treated. One right inferior PV was not treated due to occurrence of phrenic nerve palsy when isolating the right superior PV. Median follow-up was 2.5 months (0-6 months).

Terminal QRS axis has the potential to differentiate arrhythmogenic right ventricular cardiomyopathy from right ventricular outflow tract (RV oT) ectopy.

— Pieter Koopman1,3, e milie e mpsen2, e velyne Roets 2, Thomas Neyens2, Anton Gorgels 3, Paul Volders 3

(1Heart Centre Hasselt, Jessa Hospital, Hasselt, Belgium, 2Hasselt University, Hasselt, Belgium, 3Maastricht University Medical Centre, Maastricht, The Netherlands).

Aims

Arrhythmogenic right ventricular cardiomyopathy (ARVC) is associated with delayed electrical activation of the right ventricle (RV). The aim of this study was to assess direction of the terminal axis (TA) of the QRS complex on 12-lead electrocardiogram (eCG) as a new method to add to the pathophysiological understanding of this condition.

methods

We retrospectively determined TA in 170 patients with a clinical diagnosis of ARVC and 26 with right ventricular outflow tract (RV oT) ectopy without structural abnormalities, as compared to 50 normal eCGs. TA was defined as the frontal plane axis of the terminal QRS activation at 20 ms before the end of the QRS and was visualized on a circular diagram.

Belgian Society of Cardiology
Abstracts

**Objective**
To identify long term effects of AF on the progression of MR/TR.

**Methods**
Mitral/tricuspid valve regurgitation was assessed over a period of 5 years in 41 patients with permanent AF, in 40 patients with non-permanent AF and in 86 control patients with persistent sinus rhythm. Consecutive AF and control patients were selected retrospectively from the outpatient cardiology clinic database and the medical check-up database. The exclusion criteria were: left ventricular ejection fraction < 55%, LV end diastolic diameter > 55 mm, significant structural or functional valve disease, follow-up period < 5 years, age < 45 years. Severity of valve regurgitation was graded from 0 to 4. Significant MR/TR was defined as MR/TR grade > 2.

**Results**
At baseline, AF patients had more severe MR/TR than control patients (see table). After 5 years, progression of ≥ 1 grade MR and TR was more prevalent in the AF patients than in the control group. Over a period of 5 years, significant MR/TR developed in 10% and 25% of the patients with permanent AF, respectively, and in none of the control patients. Logistic regression analysis identified the presence of permanent AF as an independent predictor for progression of TR (OR 10.3; 95% CI 1.2-85) and as a non-independent predictor for the progression of MR (OR 2.3, 95% CI 0.3-21) after adjusting for age, cardiac risk factors and baseline MR/TR severity.

**Conclusions**
The presence of AF is associated with significant progression of MR/TR over a period of 5 years. These data suggest possibly a beneficial effect of sustained rhythm control on MR/TR progression in AF patients.

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**Atrial fibrillation and long-term risk for progression of mitral/tricuspid valve regurgitation**

**Table**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Age, y</th>
<th>Baseline MR grade</th>
<th>Baseline TR grade</th>
<th>MR progression by ≥ 1</th>
<th>TR progression by ≥ 1</th>
<th>MR &gt; 2 at 5 y</th>
<th>TR &gt; 2 at 5 y</th>
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<tbody>
<tr>
<td>Sinus</td>
<td>50 ± 2</td>
<td>0.6 ± 0.5</td>
<td>0.7 ± 0.5</td>
<td>5.8%</td>
<td>2.3%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Non-permanent AF</td>
<td>66 ± 8</td>
<td>1.1 ± 0.5</td>
<td>1.2 ± 0.6</td>
<td>19.5%</td>
<td>29.3%</td>
<td>4.9%</td>
<td>7.3%</td>
</tr>
<tr>
<td>Permanent AF</td>
<td>68 ± 11</td>
<td>1.3 ± 0.5</td>
<td>1.2 ± 0.6</td>
<td>22.5%</td>
<td>32.5%</td>
<td>10%</td>
<td>25%</td>
</tr>
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<td><em>P</em>-value</td>
<td>&lt; 0.001</td>
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<td>&lt; 0.0001</td>
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**Basic science**

**Targeting of Vascular Cell Adhesion Molecule-1 by 18F-labeled nanobodies for PET/CT imaging of inflamed atherosclerotic plaques.**

**Authors**

**Conclusions**
The presence of AF is associated with significant progression of MR/TR over a period of 5 years. These data suggest possibly a beneficial effect of sustained rhythm control on MR/TR progression in AF patients.
mice was performed at 2h30 post-injection of [18F]FB-cAb-
and for the determination of the specificity of the tracer in non-invasive PeT/CT imaging of VCAM1 expression in a murine model and may represent an attractive tool for imaging vulnerable atherosclerotic plaques in a murine model and may represent an attractive tool for imaging vulnerable atherosclerotic plaques in patients.

Secondary prevention: In 2012-2013, 14.8% of patients were receiving lipid lowering medication, improved substantially: 11.5%; 14.2% in eA II; 17.3% in eA III; 22.6% in eA IV. Likewise, the therapeutic control of blood pressure (< 140/90 mmHg) in patients on blood pressure lowering drugs, improved: 53.7% in eA II; 74.3% in eA III; 92.8% in eA IV. Likewise the proportion of central obesity remained more or less the same: 27.3%; 24.8% and 29.3% in the 3 surveys respectively. The proportion of obese patients (BMI≥ 30) remained more or less constant: 22.7% in eA I; 23.5% in eA II; 23.6% in eA III. The proportion of patients with known diabetes increased: 10.1%; 14.3%; 19.7% on eA II; 24.1% in eA III. The therapeutic control of blood pressure (< 140/90 mmHg in patients with diabetes), in patients on blood pressure lowering drugs, improved: 53.7% in eA II; 74.3% in eA III; 92.8% in eA IV. Likewise the proportion of patients whose blood pressure was controlled (BP < 140/90 mmHg) increased from 43.1% to 88.1% and 92.8% and the use of blood pressure lowering drugs, improved: 53.7% in eA II; 74.3% in eA III; 92.8% in eA IV. Likewise the proportion of patients whose blood pressure was controlled (BP < 140/90 mmHg) increased from 43.1% to 88.1% and 92.8% and the use of blood pressure lowering drugs, improved: 53.7% in eA II; 74.3% in eA III; 92.8% in eA IV.

Conclusion: The management of CHD patients across Belgium showed some contrasting findings. A substantial decrease in smoking prevalence, mental blood pressure and overall blood pressure decreased in the majority of patients greatly improved, although target levels for LDL cholesterol were not completely reached in patients on lipid lowering medication. In patients with diabetes, the percentage of patients whose LDL cholesterol decreased and obesity as well as central obesity were important issues which should be further targeted in the management of CHD patients.
Abstracts

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(CS) analysis. Mid-ventricular segmental pressure-CS-loops, as measure of regional myocardial work (RMW), were recorded with normal AV conduction (AAI pacing in the RA) versus BBB-like conduction (DDD pacing in RA and RV).

Results

DDD pacing acutely induced electrical and mechanical dyssynchrony of the LV, presented by an almost doubling of the QRS width ($P < 0.0001$), and the occurrence of an early septal bouncing pattern (septal flash) in both 2D echocardiography and CS (Figure A and C). Within 8 weeks of rapid DDD pacing, cardiac changes showed typical features of a DCM with BBB: the LV septal/lateral wall thickness ratio significantly decreased by –41% at eD ($P < 0.0001$) and –42% at eS ($P < 0.0001$) (Figure B), while LV diameter significantly increased by + 21% at eD ($P < 0.0001$) and + 30% at eS ($P < 0.0001$) (Figure D), respectively. LV eD and eS volumes significantly increased by + 48% ($P < 0.0001$) and + 61% ($P < 0.0001$), respectively.

After that time, acute switching from DDD to AAI resulted in a significant increase in LV stroke work of + 37% ($P = 0.034$) and a significant increase in $dP/dt$ max by + 30% ($P = 0.025$). Furthermore, RMW more than doubled in the septal wall ($P < 0.0001$), and decreased by –30% in the lateral wall ($P = 0.005$) (Figure C).

conclusions

To our knowledge, this is the first animal model of rapid DDD pacing on the RA and RV which provides all hallmarks of DCM with BBB which are typical features of a DCM with BBB: the LV septal/lateral wall thickness ratio significantly decreased by –41% at eD ($P < 0.0001$) and –42% at eS ($P < 0.0001$) (Figure B), while LV diameter significantly increased by + 21% at eD ($P < 0.0001$) and + 30% at eS ($P < 0.0001$) (Figure D), respectively. LV eD and eS volumes significantly increased by + 48% ($P < 0.0001$) and + 61% ($P < 0.0001$), respectively.

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To our knowledge, this is the first animal model of rapid DDD pacing on the RA and RV which provides all hallmarks of DCM with BBB which are typical features of a DCM with BBB: the LV septal/lateral wall thickness ratio significantly decreased by –41% at eD ($P < 0.0001$) and –42% at eS ($P < 0.0001$) (Figure B), while LV diameter significantly increased by + 21% at eD ($P < 0.0001$) and + 30% at eS ($P < 0.0001$) (Figure D), respectively. LV eD and eS volumes significantly increased by + 48% ($P < 0.0001$) and + 61% ($P < 0.0001$), respectively.

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Regional motion patterns and myocardial work load by switching pacing modes. This model will be instrumental to obtain new insight into the pathophysiology of LV remodelling in different cardiomyopathies.

FDG-PET as novel, non-invasive measure of regional myocardial work in LBBB-like dyssynchrony.

**Background**
We hypothesize that regional myocardial energy consumption reflects regional myocardial work (RMW). This study was set up to investigate if regional myocardial glucose metabolism, as assessed by 18F-fluorodeoxyglucose (FDG) positron emission tomography (PET), can describe RMW defined by the regional left ventricular (LV) pressure-strain loop area. For this, we used a newly developed chronic rapid pacing animal model of dilated cardiomyopathy (DCM) and left bundle branch block (LBBB) to induce LV dilatation and asymmetric remodelling. Ten sheep were subjected to rapid (180 bpm) sequential pacing on the right atrium (RA) and the mid free wall of the right ventricle (RV). After 8 weeks, all animals had developed LV dilatation and asymmetric remodelling, with LBBB-like ventricular activation and, consequently, an LBBB type of LV motion and function. FDG-PET scans were performed twice, under pure RA (AAI) pacing and under sequential RA/RV (DDD) pacing, the latter inducing controllable regional function inhomogeneity. Further, all animals underwent pressure-volume loop measurements and simultaneous echocardiographic ventricular strain acquisitions of the mid-LV segments. These data were used to calculate LV segmental pressure-strain loops, representing RMW, which were then compared to PET results.

**Results**
While AAI stimulation caused a normal ventricular action, DDD pacing resulted in reproducible patterns of inhomogeneous RMW distribution (Figure). In DDD, we observed a significant septal to lateral wall difference in both FDG uptake (11.7 ± 4.1 vs 13.3 ± 3.8 standardised uptake values; \(P = 0.001\)) and LV pressure-strain loop area (190 ± 139 vs 943 ± 374 mmHg%; \(P = 0.001\)). No relevant regional difference in FDG uptake (\(P = 0.364\)) or LV pressure-strain loop area (\(P = 0.494\)) was observed under AAI-pacing. Regional FDG-uptake and pressure-strain loop area correlated significantly (\(r = 0.58, P = 0.012\)) (Figure).

**Conclusions**
Our study indicates that regional myocardial work, assessed as the regional pressure-strain loop area, is related to local FDG-uptake. AV-sequential pacing (DDD) results in a low septal and in high lateral uptake while under AAI pacing, its distribution is almost homogeneous. The influence of motion and partial volume on the reconstructed FDG-uptake in the asymmetrically remodelled hearts is currently being investigated.

**Methods**
Ten sheep were subjected to rapid (180 bpm) sequential pacing on the right atrium (RA) and the mid free wall of the right ventricle (RV). After 8 weeks, all animals had developed LV dilatation and asymmetric remodelling, with LBBB-like ventricular activation and, consequently, an LBBB type of LV motion and function. Further, all animals underwent pressure-volume loop measurements and simultaneous echocardiographic ventricular strain acquisitions of the mid-LV segments. These data were used to calculate LV segmental pressure-strain loops, representing RMW, which were then compared to PET results.

**Discussion**
While AAI stimulation caused a normal ventricular action, DDD pacing resulted in reproducible patterns of inhomogeneous RMW distribution (Figure). In DDD, we observed a significant septal to lateral wall difference in both FDG uptake (11.7 ± 4.1 vs 13.3 ± 3.8 standardised uptake values; \(P = 0.001\)) and LV pressure-strain loop area (190 ± 139 vs 943 ± 374 mmHg%; \(P = 0.001\)). No relevant regional difference in FDG uptake (\(P = 0.364\)) or LV pressure-strain loop area (\(P = 0.494\)) was observed under AAI-pacing. Regional FDG-uptake and pressure-strain loop area correlated significantly (\(r = 0.58, P = 0.012\)) (Figure).
Abstracts

Results
Monocyte subsets are differentially mobilized after STEMI (figure 1). Peak troponin correlates negatively with Mon1 and positively with Mon2 at day 2 (figure 2).

Conclusion
STEVI induces a dynamic response of monocyte subsets that is influenced by the extent of myocardial injury. Larger infarcts appear to be characterized by a prolonged recruitment of Mon1 into the infarcted myocardium and a greater mobilisation level of Mon2. This implies an imbalance in the transition of the reparative response from the inflammatory to the proliferative phase.

Methods
Blood was obtained from 23 STEMI patients in the acute inflammatory (day 0), transition (day 2), and proliferative (day 5) phases and analyzed with flow cytometry. Monocytes (CD45 + CD86+) were divided into Mon1 (CD14++CD16–CCR2+), Mon2 (CD14++CD16 + CCR2+), and Mon3 (CD14 + CD16++CCR2–). Age and gender-matched healthy patients with a coronary artery disease were included as controls.

Dynamic exercise induces acute and subacute retinal microvascular changes in rehabilitating cardiac patients.

— Tijs Louwies1,2, Alice Schimmel1, Fien Van Den Eynde1, Patrick De Boever1,2, Paul Dendale1,3

(1) Hasselt University, Hasselt, Belgium, (2) Flemish Institute for Technological Research (VITO), Mol, Belgium, (3) Jessa Ziekenhuis, Hasselt, Belgium)

Background
Many cardiac patients have underlying pathologies such as hypertension and atherosclerosis that attenuate endothelial function. Endothelial dysfunction may lead to disturbed flow-mediated vasodilation responses. Exercise-based cardiac rehabilitation is an effective measure to improve endothelial function and control cardiovascular disease. Flow-mediated vasodilation responses are assessed after moderate-intensity endurance cycling tests. Increased cardiac output will increase blood flow to the periphery and induce flow-mediated vasodilation in the microcirculation. This effect has not yet been investigated in the retinal microvasculature of rehabilitating cardiac patients. The retinal vessels are fully autoregulated and thus rely on endothelial function for vasodilation. As these vessels share physiological features with the coronary microvessels, they may provide insight into the functionality of coronary vessels of rehabilitating patients.

Fig. 1 Relative monocyte subsets.

Fig. 2 Correlations between troponin and monocyte subsets at day 2.
Methods. In vitro hypertrophy is induced using protein kinase A rat cardiomyocytes (NRVMs) using phosphorylase (PK) and AMPK is activated using 12.5 M of A769662. Cardiac hypertrophy is evaluated by measuring and analyzing cell surface area measurement. In vivo cardiac hypertrophy is induced by angiotensin II (AngII) in conscious rat and evaluated by echocardiography and cell surface area measurement. The results were expressed as mean ± standard deviation (SD), and the statistical significance was determined using one-way ANOVA followed by Bonferroni post-hoc test. * represents significant differences compared to the control group (P < 0.05).

Results. 1. The first maximal endurance test, at the beginning of the program, was performed at the start of the exercise program. The first maximal endurance test, at the beginning of the program, was performed at the start of the exercise program. The first maximal endurance test, at the beginning of the program, was performed at the start of the exercise program. The first maximal endurance test, at the beginning of the program, was performed at the start of the exercise program. The first maximal endurance test, at the beginning of the program, was performed at the start of the exercise program.

A new paradigm to prevent cardiac hypertrophy development. — Florence Mailleux1, R. Gélinas1, B. Demeulder1, J.-l. Rademakers, Jan D’hooge, Piet Claus (KU Leuven, De-}

Background. Many studies have demonstrated that activation of the AMPK pathway promotes cardiac hypertrophy through multifaceted regulation of o-GlcNAc. o-GlcNAc is a post-translational protein modification recently discovered to be involved in the regulation of cardiac function. o-GlcNAc is increased during hypertrophy. o-GlcNAc is increased during hypertrophy. o-GlcNAc is increased during hypertrophy.
Validation of the slope of the prestretch-strain relationship as an non-invasive index of left ventricle contractility — oana Mirea, C. Vallecilla, P. Claus, F. Rademakers, J D’hooge (Department of Cardiovascular Sciences, University Hospital Gasthuisberg, KU Leuven).

Objectives: Given the close relationship between diurnal variation in arrhythmic events and blood pressure rise, we sought to investigate the relationship between arrhythmia on blood pressure and these parameters in a controlled animal model.

Methods: Left ventricular (LV) afterload was increased by the inflation of a balloon in the descending aorta in eight anaesthetized pigs (weight 30–35 kg). Two-dimensional (2D) echocardiographic LV apical (2-3-4 chamber) views and pulsed wave (PW) Doppler recording of the LV outflow were obtained trans-diaphragmatically using a Vivid 9 system (GE Healthcare). Global mechanical dispersion (GMD) was defined as the standard deviation of time to peak longitudinal shortening in 18 LV segments obtained by Speckle tracking analysis (echopac v13; GE, Norway). eMW is the interval between the end of the T wave (eCG) and aortic valve closure (PW Doppler, LV outflow).

Results: Balloon inflations raised BP by an average of 103.8 ± 18.3 mm Hg (P < 0.01) and heart rate decreased significantly (P < 0.01), while QT remained unchanged. LV end-systolic and end-diastolic volumes enlarged significantly during inflation (P < 0.001) and LV ejection fraction decreased (P < 0.001). GMD increased during inflation (35.5 ± 9.9 ms vs. 51.5 ± 11.6 ms, P < 0.001) and eMW prolonged during afterload increase (30.6 ± 26.6 ms vs. 64.9 ± 14.1 ms, P < 0.001), because of a delayed aortic valve closure. Both parameters showed a strong positive correlation with BP (GMD: r² = 0.69, P < 0.05 and eMW: r² = 0.78, P < 0.05).

Conclusions: An acute increase of blood pressure is associated with enhanced mechanical disarray and electro-mechanical dissociation. These data would suggest that measuring these risk predictors during transient blood pressure increase (e.g. by a handgrip test), could unmask possible afterload-induced arrhythmic risk.
Background: National guidelines for lipid management have been updated in 2011 by the European Society of Cardiology. The objective of this study was to assess clinical practices based on these recommendations in Moroccan women compared to men.

Materials and Methods: A representative sample of patients was admitted to cardiology consultation for management of their dyslipidemia. They were questioned, clinical examination and dosage of LDL cholesterol, HDL cholesterol, total cholesterol and triglycerides.

Results: We included 103 patients (42 women, 61 men), who had a lipid-lowering treatment that was consistent with the guidelines. Depending on the number of cardiovascular risk factors, there is no significant difference between men and women in LDL-cholesterol target. 67% of women had a lower threshold of LDL-cholesterol target versus 33% had not a lower threshold of LDL-cholesterol target in men. There was not a lower threshold of LDL-cholesterol target in 5% of women and 9% of men. 65.4% of men had a lower threshold of LDL-cholesterol target versus 34.6% had not a lower threshold of LDL-cholesterol target. Conclusion: Lipid management was consistent with European guidelines for most of our patients, men and women; it stresses the importance of respect of guidelines to have more well-treated patients.

Evaluating the impact of inflammation on bone marrow-derived progenitor cell function in ischemic heart disease. — Evelien Nollet1, Hoynans VY1, Rodrigus I2, De Bock D2, Van Hoof Vo3, Dom M4, Vanassche B5, Vercruysse H5, Van Craenenbroeck eM1,6 (1Cardiovascular Diseases, Department of Translational Cardiovascular research, University of Antwerp, 2Department of Cardiac Surgery, Antwerp University Hospital, 3Department of Clinical Biochemistry, Antwerp University Hospital, 4Department of Oral and Maxillofacial Surgery, General Hospital Sint-Maarten, 5Department of Oral and Maxillofacial Surgery, General Hospital AZ Monica, 6Department of Cardiology, Antwerp University Hospital, Antwerp, Belgium).

Purpose: Bone cell dysfunction could contribute to the disappointing results of autologous bone marrow stem cell administration in ischemic heart disease. In this regard, bone marrow mononuclear cell populations and function are promising for future research. In this study, we evaluated the impact of inflammation on bone marrow mononuclear cell function in ischemic heart disease.

Methods: Bone marrow (BM) and peripheral blood (PB) was obtained from 23 CAD patients (SYNTAX score range 6-32, age 61 ± 11 yrs) and 11 healthy age-matched subjects (HS), during respectively cardiac and maxillofacial surgery. BM mononuclear cells (MNC) were evaluated in vitro for migration towards SDF1α/VeGF and differentiation capacity for granulocyte-macrophage colony forming units (GM-CFU). We quantified the number of hematopoietic progenitor cells (HPC; CD45 dimCD34 + SSClow) and endothelial progenitor cells (ePC; CD45dimCD34 + KDR+). Plasma IFNy, TNFα, IL-6, VeGF and bFGF levels were measured in PB and BM using Meso Scale Discovery. The expression level in BM-MNC of the cytokine receptors TNFR1 and 2, IFNyR1, IL-6R, CXCR4 and VeGFR2 was determined by RT-PCR.

Results: The GM-CFU differentiation capacity of BM-MNC was decreased in patients with CAD compared to HS. Whereas migration capacity of BM-MNC did not differ between groups, it decreased with increasing CAD complexity, as assessed by SYNTAX score (r=-0.657, P= 0.002). Furthermore, a depletion of HPC, but not ePC in BM was observed in the setting of CAD, accompanied with a recruitment of ePC into the circulation. In CAD patients, IFNy and TNFα levels were elevated in BM but did not correlate with any numerical or functional assessment. Moreover, no differences in cytokine receptor expression on BM-MNC were found between CAD and HS.

Conclusion: Whereas spontaneous recruitment of ePC was increased in BM of CAD compared to HS, whereas migration capacity of BM-MNC did not differ between groups, it decreased with increasing CAD complexity. These results suggest that the increased recruitment of ePC in BM of CAD patients could contribute to the reduced efficacy of autologous bone marrow stem cell therapy. However, the observed increase in inflammatory status in BM from CAD patients was not related to the observed HPC depletion, suggesting that other mechanisms are at play.
Background — The efficacy of autologous bone marrow cell therapy to ameliorate heart disease could be hampered by intrinsic, lower mesenchymal function. We aimed to assess if and how mesenchymal cell dysfunction is related to inflammation.

Methods — Bone marrow (BM) and peripheral blood (PB) samples were obtained from 17 patients with coronary artery disease (CAD, SYNTAX range 6-35, LV ejection fraction (LVEF) 62 ± 2%) and 11 healthy subjects (HS). BM mononuclear (MNC) cells were evaluated for granulocyte/macrophage colony-forming units (GM-CFU) and 11 healthy subjects (HS). BM mononuclear (MNC) cells were evaluated for granulocyte/macrophage colony-forming units (GM-CFU) and erythroid (BFU-e) differentiation capacity and in vitro migratory response towards SDF-1 α and endothelial (ePC; CD45 dimCD34 + KDR+) progenitor cells in BM and PB by flow cytometry. Plasma levels of the cytokine receptors TNFR1 and 2, IFNGR1, Il-6R, and endothelial (ePC; CD45 dimCD34 + KDR+) progenitor cells were measured using Meso Scale Discovery. The expression of the cytokine receptors TNFR1 and 2, IL-6R, TNF-α, VEGF, and IL-6 was assessed in BM and PB using NanoString nCounter technology. A flow cytometric cytokine receptor expression analysis was performed in BM and PB by flow cytometry. The correlation of cytokine receptor expression on BM-MNC was found to be inversely related to the complexity of CAD, as assessed by the syntax score (r=-0.682, P < 0.011). Yet, a significant HPC recruitment was observed (P < 0.011). In BM, no alterations in ePC or ePC numbers were observed, while circulating ePC numbers correlated negatively with LVEF (P = 0.047) and PB (P = 0.012) in patients with heart failure (HF) (P < 0.011) patients. Moreover, inflammatory markers were studied in relation to inflammation.

Results — Concentrations of inflammatory markers varied between patients. IL-6 and TNF-α were strongly increased in patients with a history of heart disease (CAD and ICM group), but not in non-ICM. Similarly, elevated ePC recruitment observed in IHD will contrast the increased effector cell recruitment in ICM. In HF, only IL-6 and TNF-α were strongly increased in patients with severe IHD, which could contribute to a reduced efficacy of autologous stem cell therapy. This functional impairment is not observed in non-HF. These findings suggest an increased determinant on the progenitor cell function that reduced cardiac output. Cytokine analysis revealed that BM dysfunction is not related to the amount of hypertrophy. BM dysfunction is not related to inflammation.

Conclusions — The efficacy of autologous bone marrow cell therapy to ameliorate heart disease could be hampered by intrinsic, lower mesenchymal function. We aimed to assess if and how mesenchymal cell dysfunction is related to inflammation.

Methods: In children with congenital heart defects (VSD) (n = 14), atrial septal defects (ASD) (n = 3) and Pulmonary atresia with intact ventricular septum (PA-VS) (n = 4) scheduled for primary surgical repair were investigated. 

Results: Levels of mRNA encoding for Il1β and Il6 were significantly higher in patients with VSD compared to the other groups (P < 0.05). In contrast, levels of Il10 and HSP90 were significantly lower in patients with VSD compared to the other groups (P < 0.05).

Conclusions: The results show differential expression of genes involved in myocardial remodelling in children with congenital heart defects. This finding might help in the identification of patients at risk of complications and guide the timing of surgical repair.
Adiponectin-deficiency and increased inflammation are associated with adipokine resistance, mitochondrial dysfunction and impaired muscle function, suggesting an important role for adiponectin in the etiology of skeletal muscle dysfunction in CHF patients.

- **Results**

  - **Methods:** Myoblasts and myotubes were differentiated from muscle biopsies (m. vastus lateralis) of healthy donors and age-matched patients. Cultures were transfected with siAdipoR1 and/or treated with adiponectin (10 ng/ml; 72h).

  - **Results:** Primary CHF myotubes preserve the features of adiponectin resistance at the level of the skeletal muscle. Therefore, primary CHF myotubes from patients were transfected with siAdipoR1 and/or treated with adiponectin (10 ng/ml; 72h).

- **Conclusion:** CHF muscle cells exhibited a pro-inflammatory phenotype as evidenced by an increased level of cytokines (TNF-α, IL-6). This was associated with a downregulation of AdipoR1 and its downstream signalling pathway (pAMPK, pAMPK/AMPK, pAcc-p53). In contrast, treatment with adiponectin (10 ng/ml; 72h) partially re-established the siAdipoR1-induced delay in cell proliferation and myogenesis in CHF myotubes.

- **Discussion:** CHF muscle cells exhibited a pro-inflammatory phenotype as evidenced by an increased level of cytokines (TNF-α, IL-6). This was associated with a downregulation of AdipoR1 and its downstream signalling pathway (pAMPK, pAMPK/AMPK, pAcc-p53). In contrast, treatment with adiponectin (10 ng/ml; 72h) partially re-established the siAdipoR1-induced delay in cell proliferation and myogenesis in CHF myotubes.
Osteoglycin prevents cardiac dilatation and dysfunction after myocardial infarction through altered collagen maturation.

**Background**
Osteoglycin (oGN) is a small leucine-rich proteoglycan previously described as a marker of cardiac hypertrophy, yet its role in scar formation and collagen maturation following myocardial infarction (MI) is unknown.

**Methods**
Permanent ligation of the descending coronary artery was performed in oGN null mice and wild type (WT) littermates. Sections of infarcted and remote myocardium were examined by light and electron microscopy. Circulating oGN levels in patients with heart failure (HF) of ischemic and non-ischemic etiology.

**Results**
Increased oGN expression in the infarct scar promotes proper collagen maturation and protects against cardiac disruption and adverse remodeling following MI. In human HF, oGN is a promising biomarker for ischemic HF and correlated with survival, left ventricular volumes and other markers of fibrosis.

**Conclusion**
Osteoglycin expression in the infarct wall promotes proper collagen maturation and prevents against cardiac disruption and adverse remodeling following MI. In human HF, oGN is a promising biomarker for ischemic HF.
beneficial effects of the Il33/ST2l pathway. sST2 acts as a decoy receptor for Il33, preventing the Il-33/ST2l signaling axis has cardioprotective effects by countering mechanical stress in both cardiac fibroblasts and cardiomyocytes. The ST2 gene is induced by mechanical stress and exists in 2 forms: a transmembrane receptor (ST2l) and a soluble receptor (sST2). The ST2 gene is induced by mechanical stress and exists in 2 forms: a transmembrane receptor (ST2l) and a soluble receptor (sST2). The ST2 gene is induced by mechanical stress and exists in 2 forms: a transmembrane receptor (ST2l) and a soluble receptor (sST2). The ST2 gene is induced by mechanical stress and exists in 2 forms: a transmembrane receptor (ST2l) and a soluble receptor (sST2). The ST2 gene is induced by mechanical stress and exists in 2 forms: a transmembrane receptor (ST2l) and a soluble receptor (sST2). The ST2 gene is induced by mechanical stress and exists in 2 forms: a transmembrane receptor (ST2l) and a soluble receptor (sST2).
to 7% (mean 8.5% ± 2.7%). The primary outcome was cardiac death. During follow-up of 4.2 (IQR 3.5-4.9) years. Baseline RV FAC was not associated with the composite endpoint of all-cause mortality or heart transplantation at latest follow-up (HR 0.90, 95% CI 0.86-0.94, \( P = 0.249 \)). The 1,25(\( \text{OH} \))\( _2 \)D to PTH(1-84) ratio, and the change in RV FAC (HR 0.50, 95% CI 0.30-0.82, \( P = 0.034 \)) were, independently of neurohumoral activation, associated with a decrease in the likelihood of RV response (HR 0.32, 95% CI 0.12-0.89, \( P = 0.029 \)) and more severe ventricular septal septal hypertrophy (HR 5.50, 95% CI 1.83-16.83, \( P = 0.002 \)). For all patients, there was a significant association between RV response and the composite endpoint of all-cause mortality or heart transplantation. However, RV FAC at one year (HR 0.90, 95% CI 0.86-0.94, \( P = 0.249 \)) did not predict the change in RV FAC (HR 0.60, 95% CI 0.28-1.28, \( P = 0.210 \)), and we assessed covariates associated with RV response as an improvement in RV FAC (HR = 0.001, 95% CI 0.00-0.94, \( P < 0.001 \)) and the change in RV FAC (HR 0.50, 95% CI 0.30-0.82, \( P = 0.034 \)) were, independently of neurohumoral activation, associated with a decrease in the likelihood of RV response (HR 0.32, 95% CI 0.12-0.89, \( P = 0.029 \)). For all patients, there was a significant association between RV response and the composite endpoint of all-cause mortality or heart transplantation. However, RV FAC at one year (HR 0.90, 95% CI 0.86-0.94, \( P = 0.249 \)) did not predict the change in RV FAC (HR 0.60, 95% CI 0.28-1.28, \( P = 0.210 \)), and we assessed covariates associated with RV response as an improvement in RV FAC (HR = 0.001, 95% CI 0.00-0.94, \( P < 0.001 \)) and the change in RV FAC (HR 0.50, 95% CI 0.30-0.82, \( P = 0.034 \)) were, independently of neurohumoral activation, associated with a decrease in the likelihood of RV response (HR 0.32, 95% CI 0.12-0.89, \( P = 0.029 \)). For all patients, there was a significant association between RV response and the composite endpoint of all-cause mortality or heart transplantation. However, RV FAC at one year (HR 0.90, 95% CI 0.86-0.94, \( P = 0.249 \)) did not predict the change in RV FAC (HR 0.60, 95% CI 0.28-1.28, \( P = 0.210 \)), and we assessed covariates associated with RV response as an improvement in RV FAC (HR = 0.001, 95% CI 0.00-0.94, \( P < 0.001 \)) and the change in RV FAC (HR 0.50, 95% CI 0.30-0.82, \( P = 0.034 \)) were, independently of neurohumoral activation, associated with a decrease in the likelihood of RV response (HR 0.32, 95% CI 0.12-0.89, \( P = 0.029 \)). For all patients, there was a significant association between RV response and the composite endpoint of all-cause mortality or heart transplantation. However, RV FAC at one year (HR 0.90, 95% CI 0.86-0.94, \( P = 0.249 \)) did not predict the change in RV FAC (HR 0.60, 95% CI 0.28-1.28, \( P = 0.210 \)), and we assessed covariates associated with RV response as an improvement in RV FAC (HR = 0.001, 95% CI 0.00-0.94, \( P < 0.001 \)) and the change in RV FAC (HR 0.50, 95% CI 0.30-0.82, \( P = 0.034 \)) were, independently of neurohumoral activation, associated with a decrease in the likelihood of RV response (HR 0.32, 95% CI 0.12-0.89, \( P = 0.029 \)). For all patients, there was a significant association between RV response and the composite endpoint of all-cause mortality or heart transplantation. However, RV FAC at one year (HR 0.90, 95% CI 0.86-0.94, \( P = 0.249 \)) did not predict the change in RV FAC (HR 0.60, 95% CI 0.28-1.28, \( P = 0.210 \)), and we assessed covariates associated with RV response as an improvement in RV FAC (HR = 0.001, 95% CI 0.00-0.94, \( P < 0.001 \)) and the change in RV FAC (HR 0.50, 95% CI 0.30-0.82, \( P = 0.034 \)) were, independently of neurohumoral activation, associated with a decrease in the likelihood of RV response (HR 0.32, 95% CI 0.12-0.89, \( P = 0.029 \)).
Abstracts

Ejection Fraction/Global Strain ratio for differential diagnosis in left ventricular hypertrophy.
— efstathios Pangourelias, J. Duchenne, o. Mirea, J. Van Cleemput, M. Delforge, J. Bogaert, T. Kuznetsova, J.U. Voigt
(Department of Cardiovascular Diseases, University Hospital Gasthuisberg, Catholic University of Leuven, Leuven, Belgium, Department of Radiology, University Hospital Gasthuisberg, Catholic University of Leuven, Leuven, Belgium, Department of Hematology, University Hospital Gasthuisberg, Catholic University of Leuven, Leuven, Belgium.)

Background
We hypothesize, that the relation between ejection fraction (eF) and global longitudinal strain (GLS) may be used to differentiate patients with reduced ejection fraction (HFrEF) treated with neurohumoral blockers.

Methods: PV with 99Tc-labeled red blood cells (99Tc-RBC) was measured in a pilot study (n=7) as well as clinically in a prospective cohort (n=18) treated with optimal medical (OM) therapy and reduced ejection fraction (HFrEF). Scans were performed with a triple mode gamma camera (TriCam®, Siemens Healthineers). PV was assessed with the distance method, bicameral method and monoplane method.

Results: 67% of patients had a contracted PV (measured PV < ideal PV) with 42% even demonstrating hypovolemia (measured PV < 90% of ideal PV), and only 8% had hypervolemia (measured PV > 110% of ideal PV). BMI was the only parameter significantly related to PV (P < 0.05). No significant correlations were found with BNP, LVEF, or with any other parameter.

Conclusion: An accurate assessment of PV cannot be made by clinical exam. Secondly, in contrast with general belief, PV was significantly lower than predicted values in two thirds of patients while hypovolemia was exceptional. The dichotomy between the classical pathophysiologic concept of PV regulation as neurohumoral activity, diuretic use, LVEF, and renal function vs. the changing hemodynamics of patients with HFrEF suggests that PV regulation is a complex process that needs further investigation.
Background To investigate the relationship between segmental hypertrophy magnitude (HM) and local peak longitudinal strain (lS) under different pathologic substrates. Additionally, to determine the impact of additional factors [left ventricular (LV) level of hypertrophy and histology] on lS measurements.

Methods We included 25 patients with biopsy-proven cardiac amyloidosis (CA) (65.9 ± 11.1 years, 68% male, 60% AL type) and 20 patients with hypertrophic cardiomyopathy (HCM) matched for maximum LV wall thickness (51 ± 17 years, 70% male). The LV was divided into three levels (base, mid, apex) with 6 segments each (18 segment model). Segmental lS was assessed with speckle tracking echocardiography. HM was measured in short-axis magnetic resonance cine loops. Segments with > 13 mm wall thickness were considered hypertrophic.

Results In total, 810 segments were evaluated of which 147 (32.7%) in CA and 84 (23.3%) in HCM were hypertrophic (maximum thickness 16.1 ± 2.8 mm in CA vs 16.6 ± 2.8 in HCM, P = 0.554). For the same HM, segmental lS was more impaired in CA (–8.1 ± 5.2% vs –13.4 ± 4.5% in HCM, P = 0.0008) (Figure). Correlation between HM and lS was slightly larger among HCM hypertrophic segments (r = 0.357, P = 0.006 vs r = 0.274, P = 0.005 in CA). Regression analysis revealed that the combination of HM, level and histologic substrate accounted for 0.72 of segmental lS variability (P < 0.0005) with thickness explaining about half of it (R2 = 0.541, P < 0.0005) (Figure).

Conclusions Our study indicates that thickness explains more than half of segmental lS variability and it is an important factor to be taken into consideration when regional myocardial function is to be evaluated by longitudinal strain measurements.
Abstracts

Background
Soluble suppression of tumorigenicity (sST2) is an emerging biomarker of cardiac remodeling and fibrosis. Previous studies indicate the diagnostic and prognostic utility of this protein in patients with heart failure (HF). This study examined the existence of an sST2 threshold value, above which the diagnosis of heart failure is beyond doubt. We investigated the additional diagnostic and prognostic value of sST2 to B-natriuretic peptide (BNP) measurements in emergency department (ED) patients with uniparous acute heart failure.

Methods
48 ED patients (56% male, 44% female; aged 69 ± 14 years) with acute dyspnea were included in the study between May and June 2014. Serum samples (sST2 and BNP measurements) and clinical variables (systolic and diastolic blood pressure, edema, ejection fraction etc.) were analyzed. Enzyme-linked immunosorbent assay (ELISA) was used for ST2 and BNP measurements. The primary endpoint was a final clinical diagnosis of heart failure. To identify heart failure patients the physicians relied on classic diagnostic parameters for HF (cardiomegaly, jugular distention, peripheral edema, body mass index (BMI), ejection fraction etc.). A second primary endpoint was the 6- and 9-month readmission or mortality rate. Statistical analysis comprises univariate and multivariate logistic regression, receiver operator curve (ROC) analysis, Wilcoxon rank sum test, Kaplan Meier analysis etc.

Results
In the 48 dyspneic subjects, of whom 48% (n = 23) were diagnosed with heart failure, the median sST2 was 52.6 ng/ml (IQR = 85.3). sST2 levels were significantly associated with the diagnosis of heart failure (P = 0.0083). This high diagnostic utility was confirmed through ROC analysis with an area under the curve (AUC) of 0.9112 (AUC BNP = 0.8522). The optimum cut-point for the sST2 levels determined by ROC was 42.61 ng/ml. Among patients with an sST2 value > 42.61 ng/ml and a baseline BNP level > 285.24 ng/l, 100% (n = 15/15) suffered from heart failure, contrary to the 10% (n = 1/10) of the patients with marker values below these reference level.

Baseline ST2 levels were correlated with baseline BNP levels (r = 0.47; P = 0.0007).

After 6 months, 38% (n = 18) of the patients had experienced an adverse event. Median concentrations of ST2 at presentation to the emergency department were higher among the group with an adverse event within 6 months. However the Wilcoxon rank sum test demonstrated that this difference was not significant between the two groups.

By both the Kaplan Meier analysis and the Cox regression analysis, sST2 was not associated with readmission or mortality in our study.

Conclusions
Based on our results, serum ST2 measurement has additional diagnostic value to BNP for the diagnosis of heart failure.
Diagnosis of heart failure in ED patients presenting with acute dyspnea as cardinal symptom. The combination of these two biomarkers has the highest sensitivity but it is also the most expensive option. Therefore, this combined approach is recommended for the clinical work of emergency care. Our study results did not confirm the prognostic value of ST2.


Background Oral hydralazine/isosorbide dinitrate (HYD/ISDN) is often used to maintain a favorable hemodynamic response achieved with intravenous vasodilator therapy in advanced decompensated heart failure (ADHF). However, the optimal HYD/ISDN dosing strategy and tolerance to HYD/ISDN application is unclear.

Methods Medical records of 147 consecutive ADHF patients who underwent placement of a pulmonary artery catheter and received intravenous vasodilator therapy were reviewed. Baseline hemodynamic response was defined as (PAWP ≤ 8 mmHg, CVP ≤ 8 mmHg, CI ≥ 2.20 l/min/m², without emergent hypotension). Results Sixty-one percent of patients were subsequently converted to oral HYD/ISDN combination therapy through a standardized conversion protocol (Table). Those patients had a significantly higher PAWP upon admission, compared to patients not converted (28 ± 7 versus 25 ± 8 mmHg, respectively; P-value = 0.024).

Beneficial hemodynamic response was achieved in a similar proportion of patients receiving and not receiving HYD/ISDN at 24 h (32% versus 29%; P-value = 0.762). These patients had a significantly higher single ventricular ejection fraction at baseline compared to patients who did not reach hemodynamic targets (53 ± 7 versus 44 ± 6; P-value = 0.015) and a lower proportion of patients reached left ventricular assist device placement and orthotopic heart transplantation. The incidence of inotrope and vasopressor use, left ventricular assist device placement, and orthotopic heart transplantation was significantly higher in the group that was not converted from the intravenous vasodilator agent to oral HYD/ISDN combination therapy. HYD/ISDN dosing was progressively and consistently decreased up to the moment of hospital discharge and during outpatient follow-up, primarily due to incident hypotension.

Conclusion The use of a standardized hemodynamically-guided uptitration protocol for conversion from intravenous to oral vasodilators is safe, but may warrant subsequent dose reductions upon stabilization.

Starting dose Uptitration schedule

<table>
<thead>
<tr>
<th>Vasodilator</th>
<th>Starting Dose</th>
<th>After 2 h</th>
<th>After 10 h</th>
<th>After 18 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydralazine</td>
<td>25 mg (10 mg if low MAP or unstable patient)</td>
<td>↑ to 50 mg if previous dose tolerated</td>
<td>↑ to 75 mg if previous dose tolerated</td>
<td>↑ to 100 mg if previous dose tolerated</td>
</tr>
<tr>
<td>Isosorbide dinitrate</td>
<td>10 mg</td>
<td>↑ to 20 mg if previous dose tolerated</td>
<td>↑ to 40 mg if previous dose tolerated</td>
<td>↑ to 60 mg if previous dose tolerated</td>
</tr>
<tr>
<td>Continue 60 mg TID if previous dose tolerated</td>
<td>If previous dose is not tolerated, administer highest dose tolerated TID</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Background Bioelectrical impedance analysis (BIA) allows estimation of total body water and might detect subclinical volume overload in chronic heart failure (CHF). Methods Venous blood sampling and BIA were performed in 58 consecutive CHF patients free from clinical signs of volume overload and treated with oral loop diuretics. Subclinical volume overload was defined as excess extracellular water on BIA. Results Patients with (n = 34) versus without (n = 24) subclinical volume overload were significantly older (72 ± 10 versus 65 ± 9 years; P-value = 0.016), had higher systolic blood pressure (126 ± 20 versus 114 ± 17 mmHg; P-value = 0.012), and took angiotensin-converting enzyme inhibitors more often (P-value = 0.017). Conclusions Subclinical volume overload is frequent in stable CHF patients and merits further investigation.


Background Oral hydralazine/isosorbide dinitrate (HYD/ISDN) is often used to maintain a favorable hemodynamic response achieved with intravenous vasodilator therapy in advanced decompensated heart failure (ADHF). However, the optimal HYD/ISDN dosing strategy and tolerance to HYD/ISDN application is unclear.

Methods Medical records of 147 consecutive ADHF patients who underwent placement of a pulmonary artery catheter and received intravenous vasodilator therapy were reviewed. Baseline hemodynamic response was defined as (PAWP ≤ 8 mmHg, CVP ≤ 8 mmHg, CI ≥ 2.20 l/min/m², without emergent hypotension). Results Intravenous sodium nitroprusside and sodium nitro-glycerine was the intravenous vasodilator agent used in 143 and 32 patients, respectively. Sixty-one percent of patients were subsequently converted to oral HYD/ISDN combination therapy through a standardized conversion protocol (Table). Those patients had a significantly higher PAWP upon admission, compared to patients not converted (28 ± 7 versus 25 ± 8 mmHg, respectively; P-value = 0.024).

Beneficial hemodynamic response was achieved in a similar proportion of patients receiving and not receiving HYD/ISDN at 24 h (32% versus 29%; P-value = 0.762). These patients had a significantly higher single ventricular ejection fraction at baseline compared to patients who did not reach hemodynamic targets (53 ± 7 versus 44 ± 6; P-value = 0.015) and a lower proportion of patients reached left ventricular assist device placement and orthotopic heart transplantation. The incidence of inotrope and vasopressor use, left ventricular assist device placement, and orthotopic heart transplantation was significantly higher in the group that was not converted from the intravenous vasodilator agent to oral HYD/ISDN combination therapy. HYD/ISDN dosing was progressively and consistently decreased up to the moment of hospital discharge and during outpatient follow-up, primarily due to incident hypotension.

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Hyponatremia Patterns during Hospitalization for Acute Heart Failure:— Frederik H. Verbrugge, J.L. Gro"en Hyponatremia Patterns during Hospitalization for Acute Heart Failure:— Frederik H. Verbrugge, J.L. Groen,

— Alban Dibra, Sokol Xhepa, Ilkareta Dibra

Hypothesis
Hyponatremia is associated with worse outcome in acute heart failure (AHF), but its pathophysiology is complex and heterogeneous. The temporal pattern of hyponatremia development during hospitalization for AHF may carry prognostic relevance.

Methods
We analyzed electronic medical records of Congestive Heart Failure and Pulmonary Artery Catheterization Evaluation at acute Heart Failure (DoSe-AHF) study performed (n = 716). Patients were stratified according to their pattern of hyponatremia development: (1) no hyponatremia, (2) persistent hyponatremia, (3) treatment-induced versus no hyponatremia had very similar baseline characteristics, comparable natriuretic peptide levels, and both groups had little neurohumoral activation at baseline.

Results
Persistent hyponatremia patients also had significantly lower plasma aldosterone (99 ± 14 versus 101 ± 3 meq/l; P-value = 0.980) and protein levels (serum albumin (6.3 ± 2.0 g/dL). documenting biologically active plasma aldosterone levels (775 ± 121) versus 495 ± 71 ng/L, respectively. The former versus latter group also demonstrated lower plasma aldosterone

Conclusions
— Subclinical volume overload assessed by BIA in stable CHF is associated with low serum protein levels, increased serum sodium but not serum chloride, as well as decreased ward-based sodium at admission.

Hyponatremia Patterns during Hospitalization for Acute Heart Failure:


Background
— Hyponatremia is associated with worse outcome in acute heart failure (AHF), but its pathophysiology is complex and heterogeneous. The temporal pattern of hyponatremia development during hospitalization for AHF may carry prognostic relevance. To address these issues we performed a meta-analysis of randomized trials comparing drug-eluting stents with coronary artery bypass grafting (CABG) in patients with complex coronary artery disease (CAD). Additionally, most of these trials have not been powered to evaluate outcomes such as death. To address these issues we performed a meta-analysis of randomized trials evaluating in-stent restenosis, PCI with drug-eluting stents (DeS) and coronary artery bypass grafting.

Meta-analysis of randomized trials comparing drug-eluting stents with coronary artery bypass grafting (CABG) in patients with complex coronary artery disease (CAD):— Michael S. Topol, Craig J. Hlatky, John J. Mahmarian, Robert A. Califf

Methods
— We searched for randomized trials comparing drug-eluting stents with coronary artery bypass grafting (CABG) in patients with complex coronary artery disease (CAD). We also included trials comparing PCI with drug-eluting stents with PCI with bare metal stents, PCI with drug-eluting stents with PCI with bare metal stents, PCI with drug-eluting stents with PCI with bare metal stents, and PCI with bare metal stents with PCI with bare metal stents.

Results
— A total of 7 trials with 6089 patients were included in this analysis. Compared to patients treated with PCI, patients treated with DeS had a lower risk of death (HR 0.64; 95% CI 0.53 to 0.78; P-value< 0.001) and a lower risk of death or stroke (HR 0.66; 95% CI 0.53 to 0.84; P-value< 0.001).

Conclusion
— Meta-analysis of randomized trials comparing drug-eluting stents with coronary artery bypass grafting (CABG) in patients with complex coronary artery disease (CAD) shows that PCI with drug-eluting stents is superior to PCI with bare metal stents in terms of mortality and composite endpoint of death and stroke.
deaths (10%) which occurred 28 and 59 months after stent implantation. There were no stent thromboses. The composite MACe rate was 40%. Kaplan Meier event-free survival curves are presented in figure 1.

Fig. 1
Kaplan Meier survival Curves.

conclusions
Percutaneous coronary bifurcation revascularisation with TRYT oN stents does not meet expectations of contemporary bifurcation lesion treatment with high rates of TlR and MACe.

— Johan Bennett, Maarten Vanhaverbeke, Nina Vanden Driessche, Tom Adriaenssens, Peter Sinnaeve, Walter Desmet, Christophe Dubois (Department of Cardiovascular Medicine, University Hospitals Leuven and Department of Cardiovascular Sciences, KU Leuven, Leuven, Belgium).

Background
This in-vivo study sought to provide insights regarding the feasibility of performing complex bifurcation techniques with the Absorb everolimus-eluting bioresorbable vascular scaffold (BVS).

methods
20 New Zealand white rabbits were anaesthetized and a 6 Fr arterial sheath was placed in the carotid artery extending to the distal aorta. Bifurcation stenting procedures of the aorta-iliac bifurcation were performed with 3.0x28 mm BVS using the following stenting techniques: main-vessel (MV) stenting with ballooning of side branch (SB) through the BVS struts (Provisional stenting, n = 5), T-and protrusion (TAP, n = 5), modified T (mini-crush of BVS in SB first, n = 5) and culotte (n = 5) stenting. Post with 3.5 mm non-compliant (NC) balloons at 16 atm and mini-kissing balloon post-dilatation with 3.0 NC balloons at 5 atm were performed in all procedures. Angiography, optical coherence tomography (oCT) and post-procedural micro-computed tomography (micro-CT) were performed.

risk of suffering stroke compared to patients treated with CABG (odds ratio 0.6, 95% CI 0.4 to 0.8; \( P = 0.007 \)).

conclusion
While both PCI and DeS can be used to treat patients with multivessel CAD and or left main disease, CABG is markedly superior among patients with a high angiographic risk profile and diabetes mellitus.

5-Year Clinical Follow-up of the PYTON (Prospective Evaluation of the TRYTON Side-Branch stent with an additional XIENCE-V Everolimus-Eluting Stent in Coronary Bifurcation Lesions) Study.
— Johan Bennett, Nick Milroy, Tom Adriaenssens, Rene Smeele, Yeliz Zorlu, Elif Aydin, Department of Cardiovascular Medicine, University Hospitals Leuven, Leuven, Belgium.

Background
Dedicated bifurcation stents have been proposed as a potential alternative for treatment of true coronary bifurcations. This study sought to evaluate the healing response with optical coherence tomography (oCT) and clinical outcomes of bifurcation stenting with the TRYTON Side Branch stentTM (Medtronic). Direct comparisons with contemporary bifurcation lesions and significant improvement of the side branch (SB) were treated with the TRYTON stent in the stented and non-stented main vessel (MV) in the distal aorta.

Results
Clinical follow up was performed at 1, 3, and 5 years. The clinical endpoints included the rate of major adverse cardiac events (MACe), their components, target lesion revascularization (TlR), non-target lesion revascularization (non-TlR) and stent thrombosis; MACe were defined as any of the following: all-cause death, myocardial infarction, and ischemia-driven target lesion revascularization (TlR).

Conclusions
Percutaneous coronary bifurcation revascularisation with TRYTON stents does not meet expectations of contemporary bifurcation lesions treatment with high rates of TlR and MACe.
respectively. Finally, scaffold stenting frequently caused circumferential malapposition, scaffold distortion and strut fractures, the clinical impact of which is unknown.

Percutaneous mitral valve repair in patients at high surgical risk: 1-year results from the prospective Belgian MitraClip Registry (MITRABEL).

Background
Percutaneous edge-to-edge mitral valve repair (MitraClip®) offers treatment for severe mitral regurgitation (MR) in patients at high or prohibitive surgical risk. We report the 1-year results of the Belgian MitraClip Registry.

Methods
Patients who underwent MitraClip® implantation in a Belgian hospital between October 2010 and May 2015 were prospectively included in the registry. Procedural safety, treatment efficacy, and major adverse cardiac events (MACe), defined as the combined endpoint of death, surgical mitral valve intervention, and hospitalization for heart failure (HF), were evaluated at 1 month, 6 months and 1 year follow-up.

Results
A total of 113 consecutive patients with symptomatic severe (3 or 4+) MR underwent MitraClip® therapy at 6 Belgian sites (73 ± 10 years old; 63% male; left ventricular ejection fraction (LVEF) 37 ± 13%; New York Heart Association (NYHA) functional class III or IV in 80%, logistic EuroScore 18% (IQR 9-30%), 84% functional MR).

The clip implant rate was 95%. Acute procedural success (clip implant and reduction of MR to ≤ 2+) was obtained in 96 (85%) patients, with more than one clip placed in 40 (35%). A total of 3 patients (2.7%) died within 30 days after the MitraClip® procedure. Hospital length of stay was 5 (IQR 3-8) days. Significant improvement in the severity of MR was maintained at 12 months (P < 0.001 compared with baseline), with 81% of surviving patients free from MR > 2 (Figure). Moreover, 85% of patients were in NYHA functional class I or II at 12 months (P < 0.001 versus baseline). Hospitalization for HF was significantly reduced to 19% of patients in the first year post-clip versus 62% of patients in the 2 years before the procedure (P < 0.001). The Kaplan-Meier survival at 1 year was 76%; freedom from MACe at 1 year was 63%. Nine patients (8%) required mitral valve surgery within 12 months after the procedure. Predictors of MACe in multivariate Cox regression analysis were diabetes (HR 2.5, 95% CI: 1.2-5.0), HF hospitalization in the year before the procedure (HR 2.3, 95% CI: 1.0-5.3), and age (> 60 years) (HR 2.3, 95% CI: 1.2-4.5).
Belgian Society of Cardiology

Objective. EuroSCORE II values were calculated for each subject included in our study. A total of 593 patients, treated between 2013 and 2015, were divided into two main groups according to incision type. One group accommodates patients treated with mini-thoracotomy (n = 190), the other group patients with conventional sternotomy approach (n = 403). A stepwise linear regression analysis was performed. Duration of hospitalization was used as the dependent variable in the regression model. Incision type and EuroSCORE II were used as input variables. By including EuroSCORE II values in our model, we were able to study the effect of incision type on hospitalization, while taking into account the difference in predicted operative mortality between different study subjects. In addition, an identical investigation was performed with two different types of mini-thoracotomy: endoscopic Atraumatic Coronary Artery Bypass Grafting (endo-ACAB; n = 126) and endoscopic Coronary Artery Bypass Grafting (endo-CABG; n = 64).

Results

Stepwise linear regression revealed both EuroSCORE II ($P = 0.0176$) and incision type ($P < 0.0001$) to be significant predictors of duration of hospitalization. Parameter estimates for incision type showed a decrease in duration of hospitalization when treating patients through mini-thoracotomy (mean length of stay = 8.34 days), compared to conventional sternotomy (mean length of stay = 11.56 days). The same conclusions can be drawn after identical statistical analysis for both endo-ACAB (mean length of stay = 8.67 days) and endo-CABG (mean length of stay = 7.69 days).

Conclusion

Based on our study, the minimally invasive approach seems to have a significant effect on reducing the duration of hospitalization in patients suffering from CAD. Similarly significant effects were also noticeable when comparing endo-ACAB and endo-CABG.

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Evaluation of geriatric parameters before and after transcatheter aortic valve implantation in patients with severe, symptomatic aortic valve stenosis.

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Background: Transcatheter aortic valve implantation (TAVI) is suggested in patients with severe, symptomatic aortic valve stenosis not eligible for surgical aortic valve replacement (SAVR) in order to improve survival and quality of life. The aim of this study was to evaluate the evolution of quality of life and geriatric parameters before and after TAVI. Methods: Patients with severe, symptomatic aortic valve stenosis underwent multidimensional geriatric assessment before and after TAVI: (i) 6 weeks and (ii) 6 months. The assessment included the following domains: (1) quality of life (general health [SF-36], Katz independent); (2) nutritional state (decreased appetite, loss of weight: more than 3 kg, nutritional problem); (3) cognition (Mini-Mental State exam); (4) function (exhaustion, 6 minute walking test). Results: 69 patients were evaluated before TAVI. Two patients were lost to follow-up at 6 months. 59 patients were evaluated 6 weeks after TAVI (6 deceased). Mean age was 81 ± 6 years and 43.5% were men. On a scale from 0 (worst) to 10 (excellent), general health increased from 6.6 ± 2.1 to 7.5 ± 1.4 (n = 58, P = 0.005). This remained stable thereafter (7.5 ± 1.8 to 7.6 ± 1.8, P = 0.74). Other parameters and scores remained stable. Conclusion: Although the proportion of patients independent for Katz decreased, quality of life, cognition and function improved within 6 weeks and remained stable 6 months after TAVI.


Christopher Dubois (Department of Cardiovascular Medicine and Cardiac Surgery/University Hospitals Leuven).

Background: Transcatheter aortic valve implantation (TAVI) is suggested in patients with severe, symptomatic aortic valve stenosis not eligible for surgical aortic valve replacement (SAVR) in order to improve survival and quality of life. The aim of this study was to evaluate the evolution of quality of life and geriatric parameters before and after TAVI. Methods: Patients with severe, symptomatic aortic valve stenosis underwent multidimensional geriatric assessment before and after TAVI: (i) 6 weeks and (ii) 6 months. The assessment included the following domains: (1) quality of life (general health [SF-36], Katz independent); (2) nutritional state (decreased appetite, loss of weight: more than 3 kg, nutritional problem); (3) cognition (Mini-Mental State exam); (4) function (exhaustion, 6 minute walking test). Results: 69 patients were evaluated before TAVI. Two patients were lost to follow-up at 6 months. 59 patients were evaluated 6 weeks after TAVI (6 deceased). Mean age was 81 ± 6 years and 43.5% were men. On a scale from 0 (worst) to 10 (excellent), general health increased from 6.6 ± 2.1 to 7.5 ± 1.4 (n = 58, P = 0.005). This remained stable thereafter (7.5 ± 1.8 to 7.6 ± 1.8, P = 0.74). Other parameters and scores remained stable. Conclusion: Although the proportion of patients independent for Katz decreased, quality of life, cognition and function improved within 6 weeks and remained stable 6 months after TAVI.
expressed as percentage of predicted distance, improvement was also significant at 30d (+3.3% ± 1.6; \(P = 0.0166\)) and 6m (+4.3% ± 1.7; \(P = 0.0048\)). A favorable trend was maintained at 12m (+17.1m ± 8.8 or +2.1% ± 1.9; \(P = 0.094\) for both), while at 24m 6MWD was similar to baseline values.

A significant improvement in QoL (eQ5D) was observed from baseline (0.602 [0.366; 0.805] to 30d (0.737 [0.396; 0.861]; \(P = 0.016\) and 6m (0.691 [0.364; 0.843]; \(P = 0.0048\)). This improvement in QoL was no longer significant at 12 and 24m.

**Conclusion**

In high-risk comorbid patients with symptomatic AS, TAVI results in a significant improvement of functional capacity at 30 days and 6 months follow-up, when evaluated by objective measures as a 6MWD and subjective measures as NYHA functional class. In our population, TAVI resulted in a significant but temporary improvement in quality of life 6 months follow-up, a result likely related to multiple comorbidities driving the outcome of the eQ-5D assessment.

Between January 2009 and December 2014 a total of 145 patients underwent TAVI with the SAPIEN or SAPIEN XT valve (Edwards Lifesciences) (age 82.8 ± 5.9y, 49% female, 68.3% previous coronary artery disease, 27.5% previous heart surgery, 40% previous stroke, 33.8% chronic obstructive pulmonary disease). Median STS-score was 7.2 (5.3; 9.71), median log-euroSCoRe was 25.0 (17.0; 34.54) and median euroSCoRe II was 7.3 (4.88; 14.89). Distribution of transfemoral and transapical procedures was 61 vs. 39% (89 vs. 56 procedures), respectively. All-cause mortality was 8.9%, 11.9%, 21.6% and 41.6% at 30 days, 6, 12 and 24 months, respectively, of which 50% had a non-cardiovascular cause. No patients were eligible for analysis. NYHA functional class improved significantly at 30 days and 6, 12 and 24 months follow-up (\(P < 0.001\) for all) (Figure 1). Absolute 6MWD improved significantly at 30d (+19.3m ± 8.2; \(P = 0.0166\)) and at 6m (+23.3m ± 8.1; \(P = 0.0048\)).

Background: The circumflex coronary artery (lCx) runs in close relation to the mitral valve annulus and is therefore susceptible to mitral valve surgery-related injury. A variety of underlying possible mechanisms, predisposing factors and different therapeutic strategies have been suggested, but no large case series have been published and management remains difficult. Using a MeSH terms-based PubMed search, we were able to detect a total of 42 cases of mitral valve surgery-related lCx injury, including our 2 cases. (Figure 1) We performed a comprehensive analysis regarding reported predisposing factors, diagnostic signs and outcome of available therapeutic strategies.

Methods: Preoperative coronary angiography was performed in 55% (n = 23). After additional diagnostic angiographies, overall prevalence of coronary abnormalities was 12% (n = 5). Coronary dominance was reported in 71% (n = 30), predominantly showing a left (74%, n = 22) or balanced (13%, n = 4) circulation. Right coronary dominance was present in 13% (n = 6). Ischemia was detected in the preoperative or early postoperative phase in 87% (n = 28). Delayed symptoms were present in 12% (n = 5), including 3 patients with a time interval of more than 30 days. Echocardiography demonstrated new or dynamic regional wall motion abnormalities in 79% (n = 23). In 21% (n = 6), echocardiography was negative despite coronary compromise. Electrocardiography showed myocardial ischemia in 97% (n = 32), and regional ST-segment elevations were present in 66% of these patients (n = 21). Primary treatment was surgical in 38% (n = 13) and percutaneous in 62% (n = 21). Surgical success was 92% (n = 12), while PCI was successful in 81% (n = 17).

Conclusions: We confirm the previously reported augmented risk of lCx injury during mitral valve surgery in a co-dominant or left-dominant coronary anatomy. Preoperative knowledge of coronary anomalies and right coronary dominance however do not preclude lCx injury. An anomalous lCx arising from the right coronary cusp was overrepresented in the case series, and could therefore be identified as a separate entity putting the patient at an augmented risk for perioperative injury. Larger registries however are needed to further investigate this relation. Monitoring of ECG and use of intraoperative TEE are paramount to ensure a timely diagnosis. Both surgical and interventional procedures report excellent results, although publications bias could influence these results since only 42 patients have been reported so far.
Preliminary evaluation demonstrated also the feasibility of this approach for IVUS as well.

Conclusions: Our new method for co-registration of IVUS or OCT and 3D catheter path from two angiograms appears a robust, feasible and accurate tool to guide percutaneous coronary interventions.

The IOCVA method: a solution for placement of transvenous leads across total chronic occlusions.


Background: Placing a transvenous cardial lead is a challenge in the presence of bilateral venous obstruction of the upper extremities. Alternate access options, such as switching to the contralateral side or epicardial approach exist, but are associated with greater morbidity. Elayi et al. recently described a promising new method of vascular access that allows endocardial implantation of a lead on the side of the venous occlusion.

The purpose of this study is to show the feasibility of the inside-out central venous access (IOCV A) method to gain vascular access in patients with complex central venous occlusions.

Methods: Six patients with central venous occlusions were referred for cardiac device implantation. Inside-out central venous access (IOCV A) was obtained via a percutaneous femoral approach. A catheter-dilator system was advanced via the right atrium to the most central point of the venous occlusion. The occluded vein segment was punctured with a directionally guided needle (Brockenbrough), which was advanced along intravascular or extravascular tissue planes towards the subclavicular or lower neck region. A solid wire needle was oriented towards the skin surface and advanced through the soft tissue until exit from the body was obtained. The wire was then used to pull a

A multicenter evaluation of a new method for co-registration of IVUS and 3D angiograms.

— K Houissa1, N. Cruden2, N. Uren2, J. escaned3, C. Macaya3, T. Slots4, S. Carlier1,5
(1UMons, Belgium, 2Royal Infirmary of Edinburgh, Edinburgh, UK, 3Hospital Clinico Universitario San Carlos, Madrid, Spain, 4Pie Medical Imaging BV, Maastricht, The Netherlands, 5Hôpital Ambroise Paré, Mons, Belgium).

Background: In order to optimally guide a percutaneous coronary intervention (PCI) with intravascular ultrasound (IVUS), the operator should be able to map each cross-sectional image of the pullback on the angiogram without misjudgment of location of side-branches or moderate lesions. If the angiogram remains the roadmap to perform PCI, its position on the angiographic image can be altered by rotation of the imaging frame. The loss of information of the lumen offers much less information than IVUS. Currently, available co-registration methods have several disadvantages: manual indication of common anatomical positions needed in both modalities, need for 2 angiographic projections filled with contrast, excessive X-ray exposure if real-time angiographic imaging at the cath laboratory is necessary. We present the in-vivo validation and the first multicenter in-vivo evaluation of a new co-registration of IVUS as optical coherence tomography (OCT), using the 3D catheter path of the imaging wire.

Methods: With the imaging catheter inserted in the coronary artery to be imaged, two angiograms at least 30 degrees apart are acquired, one with a contrast injection to serve as the roadmap image. Angiograms are sent via DICOM to the co-registration workstation (CAAS Workstation IV-lINQ) that streams in real-time the IVUS during the pullback. In both angiograms the 2D path of the catheter is marked, starting on the IVUS introducer in order to calculate the 3D catheter path. Co-registration is then performed using a distance mapping algorithm learning the true length of the angiogram and the position of the catheter.

Results: In vitro, angiograms of a ball on which three pigtailed markers were filmed in multiple projections. The mean + sd difference between the reference length and the one measured of the 3D reconstructed path was –0.01 + 0.4 mm using 37 paired projections. The intraobserver variability was 0.4%.

In vivo, our ongoing feasibility study has already included 19 patients. Pullback issues (stalling), breathing during acquisition and displacement of the table between the 2 angiograms were the main factors identified limiting a reliable co-registration finally obtained in 18 of 19 attempts (95%). In these, side-branches on both imaging modalities were used as reference landmarks for comparison and were found < 1 mm apart, a precision that allows an acceptable co-registration accuracy for the selection of healthy proximal and distal landing zones to stent a lesion.
Role of clopidogrel pre-treatment before PCI in stable coronary heart disease patients.

— Sabrina Joachim 1, Nicolas Lhoest 1,7, Jo Dens 1,18, Mohamed e Gred 14, Margaret McEnteggart 15, Paul Kelly 16, James Spratt 7, Erwan Bressollette 8, Peter Kayaert 9, Dave Hanratty 4, Benjamin Faurie 5, Pierfrancesco Agostoni 6, Alexandre Avran 2, Paul Knaapen 3, Simon Walsh 4, Colm de Liège. ICs: 1Faculty of Medicine and Life Sciences – Universiteit Hasselt, Hasselt, Belgium, 2Clinique de Cardiologie, Centre Universitaire, Grenoble, France, 3VU University Medical Center, Amsterdam, the Netherlands, 4Belfast City Hospital, Belfast, United Kingdom, 5Groupe Hospitalier Mutualiste de Marignane, Marseille, France, 6Université de Nice Sophiaantipolis, Grenoble, France, 7Department of Cardiology, Erasmus MC, Rotterdam, The Netherlands, 8Service de Cardiologie, CHU de Bordeaux, Bordeaux, France, 9Service de Cardiologie, CHU de Montpellier, Montpellier, France, 10University Hospital of Medicine, Cardiff, UK, 11Royal Gwent Hospital, Newport, Wales, UK, 12Institute of Clinical Sciences, University of Birmingham, Birmingham, UK, 13University of Birmingham, Birmingham, UK, 14National Institute of Cardiovascular Sciences, Karachi, Pakistan, 15Al-Hussain College of Medicine, University of Baghdad, Iraq, 16NUI Galway, NUI Galway, Ireland, 17Department of Cardiology, UCLH, University College London Hospitals, London, UK, 18Department of Cardiology, University Hospitals Leuven, Leuven, Belgium.

Background: Before diagnostic coronary angiography for stable coronary heart disease, European Society of Cardiology guidelines recommend dual anti-platelet therapy comprising of aspirin 325 mg and clopidogrel (300-600 mg) 6 to 24 hours prior to procedure. Although other studies with clopidogrel pre-treatment showed a reduced risk of ischaemic events, this strategy has never shown a decrease in all-cause mortality in the setting of a randomized controlled trial. Moreover, pre-treatment with clopidogrel increases the risk of major bleedings. Nevertheless, previous trials have shown that female gender, diabetes disease, chronic liver disease and percutaneous intervention with more than 300 mg of clopidogrel were significantly associated with hemorrhagic events.

Aim: The study does not confirm the role of clopidogrel pre-treatment before PCI in stable coronary heart disease patients.

Methods: From June 2013 until June 2014, 6 patients underwent device implantation using the IoCV A. Before diagnostic coronary angiography, 300 mg of clopidogrel were given for one month after bare metal stent implantation and 600 mg of clopidogrel two hours after the procedure. Thereafter, clopidogrel (75 mg of clopidogrel 45 mg) and aspirin (80 mg o.d.) were given for 6 to 12 months after leaving hospital. Analysis of the results was two-fold:

1. Univariable analysis of the risk factors related to incidence of hemorrhagic events.

2. Multivariable analysis of the clinical or biological risk factors related with hemorrhagic events.

Results: From June 2013 until June 2014, 6 patients underwent device implantation using the IoCV A. Our study included 202 patients that underwent PCI for stable coronary heart disease during a nine-month period in 2015 in a single tertiary hospital (CHU Grenoble, France). None of them had a previous coronary artery revascularization. In 39 patients, a dual anti-platelet therapy was continued or surgical revascularization was required. Therefore, it seems important to raise the following questions: the RECHARGE registry.

Conclusion:

The major limitation of our trial is related to the small cohort of patients in light of the low incidence of bleeding or hemorrhagic events. The role of preventive dual anti-platelet therapy with aspirin and clopidogrel in patients with stable coronary heart disease should be evaluated in a prospective trial with a larger cohort given the low incidence of events.

Validation of the hybrid technique for the percuta-

neous treatment of coronary Chronic Total Ocol- 

lection (CTO).— Michel Cousin 1, Thierry Girod 1, Olivier Delahaye 4, Alain Salesse 7, Pierre Simard 1, Charles Pirlet 1, Laurent Davin 1, Olivier Gach 1, Christophe Martinez 1, Victor Legrand 1.

Background: From June 2013 until June 2014, it patients underwent coronary device implantation using the IoCV A. Before diagnostic coronary angiography, 300 mg of aspirin (325 mg) were administered on even-numbered days or 500 mg with one clopidogrel per loading the day before PCI if they were admitted on even-numbered days. The latter group received 600 mg of clopidogrel twice before the procedure. Thereafter, clopidogrel (75 mg of clopidogrel 45 mg) and aspirin (80 mg) were given for 6 to 12 months after leaving hospital. Analysis of the results was two-fold:

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Belgian Society of Cardiology

Quality control of interventional cardiology: objective assessment by the NCDR Cath PCI risk score system (1997-2014).

To fulfill the legal obligation of quality control in the setting of the B2 (PCI) program, we recorded prospectively all in-hospital complications after PCI.

Methods
A consecutive series during the period 01.01.1997-31.12.2014 of 10.799 hospital stays where at least one PCI was performed in our center. The only exclusion criteria was referral back to referring hospital the day of PCI (N: 2.431).

The patient/clinical characteristics were: mean age = 65 y, history of cerebrovascular disease: 11%, history of peripheral vascular disease: 13%, CoPD: 10%, previous CABG: 12%, acute coronary syndromes: 57%, recent (< 24 hours) myocardial infarction: 11%, cardiogenic shock: 1.9%.

Procedural data: multivessel therapy: 13.7%, full angiographic success: 91.9%, failure: 4.1% and incomplete success: 4.1%.

Results
The following post-procedural events occurred: myocardial infarction: 4.3%, stent thrombosis: 0.8%, puncture-related bleeding (TIMI major): 0.4%, non-puncture-related bleeding (TIMI major): 0.8%, dialysis: 0.67%, cerebrovascular event (Ranking _ 1): 0.24%, emergency CABG: 0.33%, death: 1.85%. The expected mortality (NCDR Cath PCI) was 2.63%. The performance of the model to predict mortality for the entire group was excellent (AUC: 0.88). The temporal evolution evidenced an increase until 2008, followed by a decrease until 2012.

Background
The hybrid algorithm has been developed with the primary aim of improving procedural outcomes of contemporary coronary CTO-PCI. The prospective multi-center Registry of Crossboss and Hybrid procedures (ReCHARGe) aims to validate the efficacy of this algorithm by collecting data on 1200 hybrid procedures.

Methods
Patients treated with PCI for a coronary CTO, according to the hybrid algorithm, were prospectively and consecutively enrolled in 18 centers. The primary endpoint is procedural success. Data were collected on demographics, angiographic and procedural characteristics. CTOs were classified according to the J-CTO difficulty score. Procedural characteristics included data on the applied hybrid techniques and corresponding outcomes. The hybrid algorithm consists of four techniques: antegrade wire escalation (AWe), antegrade dissection & re-entry (ADR), retrograde wire escalation (RWe) and retrograde dissection & re-entry (RDR). Multiple techniques can be applied per procedure (HBR). From Jan 2014 to Sep 2015, 1057 procedures were included. Overall procedural success corresponded to 86%. The average J-CTO score equaled to 2.2 ± 1.3. easy, intermediate, difficult and very difficult CTOs could be treated successfully in 100% (99/99), 96% (203/211), 88% (287/328) and 77% (323/419) respectively. Each of the hybrid techniques (AWe, ADR, RWe, RDR) was used 849 (80%), 252 (24%), 182 (17%) and 242 (23%) times during the 1057 procedures at any time respectively. Success was reached in 62% (530/849), 64% (162/252), 26% (47/182) and 71% (173/242). As a primary strategy, each technique was successful in 63% (508/802), 65% (52/80), 26% (20/76) and 71% (70/99), resulting in a total success of 61% (650/1057). If necessary, the application of a second, third and/or fourth bail-out strategy resulted in an additional success of 56% (261/468), with ADR and RDR most preferred and successful (63% (109/172) and 72% (103/143) respectively). The failure modes and corresponding outcomes of each technique are shown in Table 1. The total success rate of the hybrid algorithm in CTO-PCI patients is shown in Figure 1. Further analysis will provide detailed information on the specific failure modes of each technique.
Background: The digital enhancement of stent image technique based on a software capable of improving fluoroscopy visualisation of metallic prosthesis. This technique could improve the assessment of correct stent deployment and theoretically help the PCI operator to choose a strategy leading to an optimal result with a diminution of thrombo-embolic or in-stent events. The purpose of this study was to assess the usefulness and impact of digital enhancement and subjective criteria in coronary PCI procedures in the routine practice.

Methods: In this single-center prospective study we measured all patients who underwent a PCI during a period of 6.3 years.

Results: Nineteen patients were included in this study.

Conclusions: Closure of the LAA, the site of 90% of thrombi in these patients, has shown to be effective in reducing thrombo-embolic events and reducing major bleeding. However incidence of strokes were unusual in the long-term outcome. This study aimed to evaluate long-term outcome of this technique.

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J Huber1, Tom Adriaenssens2, Johan Bennett2, Christophe Dubois1, Nicky Demaerel1, Stefan Janssens1, Peter Van Remoortere1, Walter Desmet2, Stefan Janssens1,2, Peter Sinha1,2 and at follow-up.

The inflammatory response in acute coronary syndromes (ACS) is correlated to infarct size and residual cardiovascular risk. High sensitivity C-reactive protein (hsCRP) and other inflammatory markers correlate to cardiovascular risk, although no linear correlation can be shown between the expression of the genes and peak CRP or hsCRP on admission.

However, no linear correlation could be shown between the expression of the genes and peak CRP or hsCRP on admission or at follow-up, reflective of initial infarct size but irrespective of ST-elevation myocardial infarction (STeMI) from non-ST-elevation myocardial infarction (NSTeMI) in the acute phase as well as at follow-up.

Expression of the genes and peak CRP or hsCRP on admission were validated by PCR: CleC4e (fold change 1.8, p = 0.004 and 0.005), acutiphase reactants (CRP), and interleukins (IL1β, IL18), both on admission and at follow-up (P < 0.05). We observed a significant correlation between peak hsCRP and hsTnT and expression of FKBP5, both on admission and at follow-up (P < 0.001), reflective of initial infarct size but irrespective of ST-elevation myocardial infarction (STeMI) from non-ST-elevation myocardial infarction (NSTeMI) in the acute phase as well as at follow-up. From the transcriptional data, we concluded that there are different gene expression patterns in ST-elevation myocardial infarction (STeMI) and non-ST-elevation myocardial infarction (NSTeMI) and residual cardiovascular risk.

High-sensitivity C-reactive protein (hsCRP) identifies patients at risk after an ACS, but the underlying pathways leading to this persisting inflammatory response in patients with acute coronary syndromes (ACS) is correlated with infarct size.

Methods: A total of 80 patients with STEMI, NSTE-MI and heart failure due to ischaemic heart disease (HF-Isch) were included. Peripheral blood gene expression profiles were collected on admission, after 3, 7 and 30 days. This pilot study reports the results of the first 30 ACS patients on admission and at 30 days follow-up. Total RNA was extracted from whole blood at both time points and microarrays were performed on Affymetrix Human Transcriptome 2.0. The results were validated with Real-time PCR and correlated to clinical characteristics and biomarkers.

Background: In the acute phase of ACS, peripheral blood gene expression profiles correlate with outcome needs further investigation.

NON-INVASIVE

Physiological determinants of secondary mitral regurgitation in patients with aortic stenosis and preserved ejection fraction - Jean-Marc Bantu-Bimbi*

Jean-Marc Bantu-Bimbi*

Denise Veltman1, Sander Trenson1, Thibault Petit1, Heinrich Liliane Jahjah, Dominique Rouselle1, Victor Parry, Francois Vandendriessche, Thierry Peyrard, Philippe Vos (Cardiology Department (CHU Saint-Pierre), Brussels University Hospital, Brussels, Belgium).

Background: Secondary mitral regurgitation (SMR) is a common finding in patients with aortic stenosis (AS), and can be observed even if trivial in early mitral valve surgery (MV) is preserved. In determinants are poorly defined. We aimed to assess the mechanisms responsible for SMR in patients presenting moderate AS, using 2D echocardiography, and evaluate the feasibility of a new non-invasive tool: balloon mitral annuloplasty (BMA).

Methods: Patients presenting moderate AS and undergoing aortic valve replacement were prospectively included. Secondary mitral regurgitation was assessed by 2D echocardiography, prior to surgery and at 1 year follow up. The patients were considered to be in SMR if the mean mitral effective regurgitant orifice (eRo) of 9 ± 5 mm² (range 3-23 mm²).

Results: Sixty patients were included; among them, 36 presented AS, with a mean aortic valve effective orifice area (EVA) of 1.6 ± 0.5 cm² (range 1.1-2.3 cm²). Two patients had an EVA < 1 cm². As compared to patients without SMR, larger left atrial volumes, larger mitral E/e' ratio and maximal aortic velocity and aortic valve area, and global and segmental longitudinal strain were observed in patients with SMR (Table 1). By contrast, LV systolic and diastolic function, left ventricular mass and left atrial volume were similar in the 2 groups. By summarizing data, significant associations between SMR and residual aortic valve area, LV mass and left atrial volume, and between regurgitant volume and residual 30-day hsCRP levels. Whether these expression patterns correlate to residual cardiovascular risk is currently under investigation.
In our series, MV leaflets were visible on sequential LVOT views in 64% of cases, where leaflets were visualized in short axis views in 54% of cases. Non-visible leaflets were observed in 36% of cases, predominantly in cases with LVOTO and mitral annular calcification.

In all cases, MV leaflets were visible on sequential LVOT views in 64% of cases, where leaflets were visualized in short axis views in 54% of cases. Non-visible leaflets were observed in 36% of cases, predominantly in cases with LVOTO and mitral annular calcification.
The results showed that the feasibility of a virtual CR program was positively perceived by most patients.

Most patients had a mobile phone (97% of whom 58% had a smartphone) and used the internet (91%). The majority of patients had a mobile phone (97% of whom 58% had a smartphone) and used the internet (91%). The majority of patients completed at least 25 questions of the survey and were included in the analysis (completion rate of 96%).

Results

The use of technology enabled CR was reported by 75% of the patients. Interest decreased with increasing age (r=-0.16; P<0.05).

The majority of patients (79%) never used a computer-based physical activity game. Heart rate monitors were used by 58% of the respondents, but 68% of them reported that they found heart rate monitoring important during home exercises. The use of physical activity monitoring in daily life was reportedly 12% of the respondents.

Respondents were interested in support via internet (70% of the respondents). The use of technology enabled CR was positively reported by 90% of the respondents. A majority interest in technology enabled CR was positively reported by 90% of the respondents. A majority interest in technology enabled CR was positively reported by 90% of the respondents.

Conclusions

The study documents the interest for technology enabled home-based CR and could guide the design of a technology-based, virtual CR intervention.

Electrocardiographic characteristics of the paced QRS complex according to different positions of the left ventricular lead in CRT patients.

Background

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Abstracts

plane. With BV pacing, neither the frontal nor the horizontal axis could differentiate between the RAo and lAo defined groups. QRSDglobal during lV and BV pacing could not discriminate between the RAo or lAo defined groups. Although with BV pacing a trend to broader QRS durations with an apical position was noted compared to a non-apical position (Table 1).

Conclusion

Determination of biplane QRS axis may be a simple strategy to differentiate lV paced eCGs of different lV lead positions, provided that RAo and lAo positions are assessed separately. QRSDglobal with lV pacing or BV pacing was not dependent on the position of the lV lead.

Results

The RAo view distinguished between an apical position (n = 21) versus non-apical position (n = 24) of the lV lead. The lAo view distinguished between anterior (n = 4), anterolateral (n = 10), lateral (n = 12), inferolateral (n = 16) and inferior (n = 3) positions.

The horizontal QRS axis during lV pacing was significantly different between the apical (median +175°) versus non-apical group (+121°, P = 0.009, Fig. 1), whereas no significant differences were observed using the frontal axis. The frontal axis during lV pacing was significantly different among the lAo defined groups: anterior (+131°), anterolateral (+164°), lateral (–163°), inferolateral (–143°) and inferior (–66°, P = 0.001, Fig. 2). No differences between the lAo defined groups were observed using the horizontal plane. With BV pacing, neither the frontal nor the horizontal axis could differentiate between the RAo and lAo defined groups. QRSDglobal during BV pacing could not discriminate between the RAo or lAo defined groups. Although with BV pacing a trend to broader QRS durations with an apical position compared to a non-apical position was noted (Table 1).

Conclusion

Determination of biplane QRS axis may be a simple strategy to differentiate lV paced eCGs of different lV lead positions, provided that RAo and lAo positions are assessed separately. QRSDglobal with BV pacing was not dependent on the position of the lV lead.

Table 1

<table>
<thead>
<tr>
<th>QRSDglobal (ms)</th>
<th>RAo View</th>
<th>lAo View</th>
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<tbody>
<tr>
<td>Apical Position</td>
<td>+175°</td>
<td>+131°</td>
</tr>
<tr>
<td>Non-apical Position</td>
<td>+121°</td>
<td>+164°</td>
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Efficacy of training programs on weight loss in obese patients at high risk for cardiovascular disease — Ines Frederix1,2, Dominique Hansen1,2, Paul Dendale1,2

Background — In 2015, more than 150 million adults were overweight of which more than 60 million were obese, this represents more than 13% of the world's population alone, at risk of cardiovascular disease. Patients try different approaches to lose weight but fail to become aware of the most effective program for specific groups of patients. The objective of this study is to provide a better understanding of the influence of different programs on weight loss.

Methods — This is a retrospective study in which 322 obese patients participated. Patients were included into a group or individual program according to their disease state. The patients' data was analyzed over a period of 1 year. In the individual program, the patient had a meeting with a dietitian every 2-4 weeks. In the group program, they participated in 3 different supporting settings: classical bicycle sessions (no support), eAB with low support (eAB low) and eAB with high support (eAB high). At the start of the program the BMI and the age of the patients were used in the multiple linear regression model. (Vo2) was measured (averaged every 10 seconds) by analysis of expired gases using a mobile ergospirometer. The level of electrical support had a significant effect on percentage weight loss (P = 0.018). Mean percentage weight loss was 6.4 ± 5.9%, 9 ± 0.6%, and 11 ± 0.5% for the individual, eAB low, and eAB high programs, respectively. Mean age was 64 ± 7 years. In the individual program, patients trained 3 times one hour a week for 3 months whereas in the group program, patients trained 1 time one hour a week for 3 months.

Results — At the start of the program (0,002 ± 0,001 ml/min), (Vo2) at an age of 64 ± 7 years, weight of 99 ± 15 kg, and BMI of 30 ± 5 was significantly lower than at the end of the program (2,99 ± 0,14 kcal/min), (Vo2) at an age of 64 ± 7 years, weight of 92 ± 13 kg, and BMI of 28 ± 4. Analysis of variance and standard multiple linear regression analysis of the data showed a significant effect on percentage weight loss (P < 0.001, CI [0.890;1.487]). In contrast, standard (3-6 MeT) of exercise training standards for secondary prevention programs of coronary artery disease are sufficiently high to contribute to the moderate-intensity exercise training (3-6 MeT) of the European Society of Cardiology's recommendations for secondary prevention programs of coronary artery disease (249 ± 14 kcal) than when cycling with low support (96 ± 13 kcal) or no support at all (91 ± 13 kcal). This study shows that eAB is a novel strategy able to provide personalized adjustments to improve exercise adherence rates, especially for the least motivated and least fit patients not being able to overcome challenges associated with classical bicycle program sessions.

Conclusions — This study shows the potential of personalized adjusting obesity programs to patients with different medical backgrounds and different physical conditions. It further demonstrates the potential of personally adjusting obesity programs to patients with different medical backgrounds and different physical conditions.
Background - From follow-up after closure of small isolated congenital shunt lesions in childhood or adolescence in patients of the present study two to recall these patients to evaluate their health and hemodynamic status.

Methods - Data, electrocardiographic and echocardiographic measurements were prospectively acquired. All patients were in sinus rhythm. Median SF-36 Score was 56 (IQR 51-58) for Physical Health, 54 (IQR 48-57) for Mental Health. No patient had sustained complications, no patient presented RV dilatation, more patients after VSD closure were symptomatic and presented problems as PH and ascending aortic dilatation, requiring systematic follow-up.

Results - Twenty-one of 133 (16%) patients with VSD closure had died. Forty-six patients (63% female, mean age 30 ± 7 years) responded. Median defect size was 9 (IQR 7-10) mm. Twenty-one of 138 (15%) patients with ASD closure had died. Forty (87%) ASDs were closed surgically (22 primary, 11-20 mm. Median age at ASD repair was 6 (IQR 4-8) years. Forty (87%) patients reported palpitations, no arrhythmia were documented. All were in sinus rhythm.
Background: The epidemiology of infective endocarditis (IE) is changing due to ageing of the general population and an increase of invasive procedures, and is therefore a relevant clinical and economical issue. This study evaluated clinical data and long-term outcome of IE in patients admitted or referred to two centers performing cardiac surgery in Ghent, Belgium, between 2006 and 2012.

Methods: We collected all patients with definite IE, who underwent device/catheter extraction and/or surgery, and 15 healthy subjects (matched for body mass index, age, gender, timing after surgery) executed a maximal cardiopulmonary exercise test, with assessment of cycling power output (W), oxygen uptake (Vo2), carbon dioxide output (VCo2), respiratory gas exchange ratio (ReR), heart rate (HR), oxygen pulse (Vo2/HR), expiratory volume (VE), tidal volume (Vt), respiratory rate, at peak exercise and ventilatory threshold. In surgery patients also measured. These parameters were compared between CABG and endo-ACAB surgery patients (P < 0.05, observed significance level 0.05, matched ReR at peak exercise).

Results: In total 174 patients (age 62 ± 15 years) were included, 40% with catheter related IE. Staphylococci were found in 40%. 29% with native valve IE, 24% with prosthetic valve IE and 12% with device or catheter related IE. 69% of all patients presented with native valve IE, 24% with prosthetic valve IE and 12% with device or catheter related IE. 20% with previous valvular IE and 4% with device or catheter related IE. In-hospital mortality was 19%. Overall in-hospital mortality was 19%.

Conclusion: Although in-hospital mortality remains high, long-term outcome of device/catheter extraction and patients treated conservatively had a higher in-hospital and long-term mortality as compared to patients undergoing cardiac surgery.

Keywords: Infective endocarditis, epidemiology, long-term outcome, comorbidities.


Background: Cardiopulmonary exercise tolerance early after minimally invasive coronary artery bypass surgery (endo-ACAB) surgery has not been studied. This may lead to suboptimal exercise prescription and/or treatment. This aim of this study was to examine exercise tolerance and cardiopulmonary function during exercise in patients early after endoscopic atraumatic coronary artery bypass surgery.

Methods: Twenty endo-ACAB surgery patients (38 mean age; 62±13 years; P = 0.01), 20 healthy controls (matched for age, gender, timing after surgery) executed a maximal cardiopulmonary exercise test, with assessment of cycling power output (W), oxygen uptake (Vo2), carbon dioxide output (VCo2), respiratory gas exchange ratio (ReR), heart rate (HR), oxygen pulse (Vo2/HR), expiratory volume (VE), tidal volume (Vt), respiratory rate, at peak exercise and ventilatory threshold. In surgery patients also measured. These parameters were compared between CABG and endo-ACAB surgery patients (P < 0.05, observed significance level 0.05, matched ReR at peak exercise).

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between 2011 and 2014. 544 patients (36%) with cryptogenic stroke were included in the study. 54 of the 544 (10%) patients were re-admitted to the hospital for recurrent CV A/TIA and/or who were diagnosed with atrial fibrillation (AF) during the study. AF was discovered in 21 of the 544 patients (4%). 6 of the 544 patients (1%) developed a recurrent CV A/TIA.

Results

The primary outcome of this study was the recurrence of cerebrovascular accident (CV A) or transient ischemic attack (TIA) between 2011 and 2014. We searched for cerebrovascular accident (CV A) or transient ischemic attack (TIA) between 2011 and 2014. We analyzed all patients who were admitted for cerebrovascular accident (CVA) or transient ischemic attack (TIA) between 2011 and 2014. 54 of the 544 patients (10%) who had a recurrent CV A/TIA were excluded from entry into the study. AF was discovered in 21 of the 544 patients (4%). From these patients echocardiographic, laboratory and clinical markers were measured.

Discussion

Stroke is an important cause of disability and the third leading cause of death. Approximately 30% of all deaths are estimated to be attributable to cerebrovascular disease. The most common causes are ischemic and intracerebral hemorrhage. The main risk factors are age, hypertension, hypercholesterolemia, diabetes mellitus, smoking and atrial fibrillation. Heart diseases, such as valvular disease, cardiomyopathy, and hypertension are the main risk factors of stroke. The incidence of stroke has been rising over the past decades. The annual incidence rate of ischemic stroke has been estimated to be 5.3–6.6 per 1,000, whereas the incidence of hemorrhagic stroke is 2.2 per 1,000.

Conclusion

Mitral valve deceleration time (MV DecT; P = 0.002) was the only significant predictor for occurrence of AF in multivariate analysis at α = 0.05. Peak systolic longitudinal strain rate (GFR; P = 0.09), glomerular filtration rate (GFR; P = 0.09), interatrial conduction delay (P = 0.06; P = 0.06), and interatrial conduction delay (P = 0.06; P = 0.06) were significant predictors for occurrence of interatrial conduction analysis at α = 0.05. Although the definition of AF is still significant predictor for occurrence of AF in multivariate analysis at α = 0.05.

After Transcatheter Pulmonary Valve Implantation: Time matters!

Right Ventricular Structural and Functional Remodeling after Transcatheter Pulmonary Valve Implantation

Time matters! MV DecT can be used to assess increased risk for atrial fibrillation in patients with prior stroke.
Results: PPVI was accompanied by remodeling (RV) characterized by significant increase of RV transverse diameters and volumes and improvement of RV systolic function (indexed RV end diastolic volume (RV eDV ind) from 123.1 ± 24.1 to 101.5 ± 18.3, P = 0.005). Despite RV output increase (RV effective stroke volume indexed (RV SV ind) from 38.4 ± 9.5 to 51.4 ± 10.7, P = 0.005), we observed a significant decrease of RV systolic function (−13.3 ± 21.5% relative reduction in fractional area change (FAC), a −12.8 ± 10.9% in RV global longitudinal strain (GLS)). Among potential predictors of greatest RV remodeling after PPVI, time after last surgical correction causing PI was the only significant predictor.

Conclusions: Following a cohort of patients with corrected ToF who underwent PPVI due to severe secondary PI, we have shown that: i) biventricular remodeling with output increase might be evident even 3 months after the valve implantation and ii) earlier intervention (<7 years after last RVoT operation) is associated with better short-term outcomes. Our data indicate that earlier interventions using stented valves may be beneficial, which may have direct impact on current guidelines for the clinical management of ToF patients.


Background: Aerobic interval training (AIT) and continuous training (ACT) both improve physical fitness (peak VO2) in coronary artery disease (CAD) patients. However, little is known on the long-term effects of AIT and ACT on peak VO2 and exercise adherence.

Methods: In this multicentre study, 200 CAD patients (90% men, mean age 58.4 ± 9.1 years) were randomized to either AIT or ACT. A total of 163 patients were assessed after 12 weeks of AIT or ACT and 12 months after their enrolment. Physical fitness (peak VO2), maximal graded cardiopulmonary exercise test on bicycle ergometer, and physical activity (steps, active energy expenditure (kcal) and physical activity duration (min)) served as primary outcomes, and peripheral endothelial function, cardiovascular risk factors and quality of life as secondary outcomes.

Results: After the 12 weeks intervention, during which 30 patients dropped out, 12 additional patients were lost to follow-up. Dropout rates (37%) were significantly more women (41.2%) versus men (25.9%), drop-out age 58 ± 9.1 years (40.3%) and had significantly lower peak VO2 compared to completers (20.7 ± 5.2 kcal/min vs 23.8 ± 5.2 kcal/min, P < 0.001). Physical fitness (peak VO2, heart rate and rated perceived exertion), cardiovascular risk factors and quality of life remained stable from 12 weeks to 12 months after the start of the intervention.

- 40% of patients increased peak VO2 and follow-up values were significantly above the predicted peak VO2. Fifty-eight percent of patients increased active energy expenditure at the follow-up measurements. In the AIT and ACT group respectively, 95.9% and 91.9% of all patients met the recommended levels of 150 min/week of moderate physical activity (p-group NS).
Abstracts

In the number of attended cardiac rehabilitation sessions influenced on prevention of recurrent ischemic disease? Do patients with comorbidities like diabetes or hypertension that might derive significantly more benefit by participating in CR than patients without comorbidities.

The study aims to investigate the influence of the number of attended cardiac rehabilitation (CR) sessions influential on prevention of recurrent ischemic disease. The primary goal is to study the effect of the number of phase II CR training sessions a patient completed on the time to first ischemic event. The secondary goal is to identify subpopulations of ischemic heart disease patients with comorbidities like diabetes or hypertension that might derive significantly more benefit by participating in CR than those patients without comorbidities.

Background – In Belgium, cardiovascular disease is the most common cause of death and there is great concern that patients participating in cardiac rehabilitation (CR) programs for ischemic heart disease significantly reduce morbidity as well as mortality.

This study aimed to investigate the influence of the number of attended CR training sessions on reducing morbidity and recurrence following an ischemic event. The present paper analyses the effect of the number of attended CR training sessions on the time to event. An event was defined as a hospitalization due to occurrence of ischemic disease or cardiac death.

Methods – Data was acquired from patient files from a regional hospital. The study included all ischemic heart disease patients who took part in a CR program in 2006, after being followed up for 9 years. Survival analysis was applied to the data, using Kaplan-Meier graphs and Cox proportional hazard models, in order to assess normal values in a similar population and with similar tools.

Results – The follow-up period was 9 years. Survival analysis was applied to the data, using Kaplan-Meier graphs and Cox proportional hazard models, in order to assess normal values in a similar population and with similar tools.

Conclusion – This multicentre study shows that the number of attended CR training sessions influenced on prevention of recurrent ischemic disease significantly reduced morbidity as well as mortality.

CR should be recommended to all subpopulations of patients.
Speckle tracking GLS was measured on a Vivid 7 GE Ultrasound echocardiograph. To be included in the analysis, the patients had to have peak velocity of at least 2.8 m/s and LV eF had to be preserved. Exclusion criteria were concomitant aortic valve regurgitation or presence of at least moderate mitral valve disease.

According to the eSG guidelines, the AS was classified as mild, moderate or severe. Patient characteristics and presence of symptoms were obtained from the medical records.

Results

101 patients were included. The patient characteristics were as follows: mean age 75 years (range 42-100), M/F ratio: 65/36. The AS was classified as mild, moderate and severe in respectively 5, 53 and 43 cases. In 3 cases of the remaining 98 patients, state of symptoms was not well documented. Of the remaining 98 patients, 59 patients were asymptomatic and 39 had symptoms.

Table 2 summarizes the correlations between speckle tracking GLS and echocardiographic parameters of AS and age. A significant correlation was found between GLS and AS VTI ratio and LV eF. There was a trend towards significance between GLS and mean gradient. However, using the cut off value of GLS < -15, we were unable to demonstrate a correlation between GLS and the classification of severity (severe or mild/moderate) of AS. Chi square statistic is 0.496, \( P = 0.481 \).

Conclusion

Our study shows a correlation between speckle tracking GLS and AS VTI ratio and LV eF in patients with AS and preserved LV EF. Speckle tracking GLS was measured on a Vivid 7 GE Ultrasound echocardiograph. To be included in the analysis, the patients had to have peak velocity of at least 2.8 m/s and LV eF had to be preserved. Exclusion criteria were concomitant aortic valve regurgitation or presence of at least moderate mitral valve disease.

Aortic stenosis in the setting of a non-referral hospital: does speckle tracking global longitudinal strain add predictive information regarding symptoms and severity?

— Danielle Tolman-de Kok, Masoud Sadreddini M.D., Jeroen Walpot M.D., (Department of Cardiology, Admiraal De Ruyter Hospital, Vlissingen and Goes, the Netherlands).

Background

In several heart diseases, it has been demonstrated that global longitudinal strain (GLS) allows to detect subclinical changes in left ventricular function before the left ventricular ejection fraction (LV eF) decreases. In the medical literature, it has been advocated that GLS < -15 is a useful cut off value for the prediction of symptoms and worse outcome in patients with aortic stenosis (AS).

Methods

In the setting of a non-referral hospital, we searched for a correlation between GLS and presence of symptoms and severity of the AS in patients with AS.

Table 2

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Rest and exercise hemodynamics in relation to symptomatic status after MitraClip therapy for functional mitral regurgitation. (△) — Van De Heyning Caroline1, Bertrand Philippe 2, Debonnaire Philippe 3, De Maeyer Catherine1, Vandervoort Pieter2, Coussement Patrick3, Paelinck Bernard1, De Bock Dina1, Vrints Christiaan1, Claeys Marc1
(1Universitair Ziekenhuis Antwerpen, Edegem, 2Ziekenhuis Oost-Limburg, Genk, 3AZ Sint-Jan, Brugge).

Background: Percutaneous mitral valve repair using MitraClip offers symptomatic benefit in patients with severe mitral regurgitation (MR) that are at high or prohibitive surgical risk. Little is known regarding the effect of MitraClip therapy on cardiac output (CO) and systolic pulmonary artery pressure (SPAP) during exercise and its relation to symptomatic status.

Methods: Patients from 3 Belgian centers with symptomatic severe functional MR were prospectively evaluated by comprehensive transthoracic echocardiography at rest and during a symptom-limited exercise test, in a non-randomized split-and-match MitraClip procedure. All patients had severe MR (≥ 3/4) at rest and in exercise at baseline (n = 26 patients) 6.1 ± 3.1 years pre-clip were evaluated.

At rest 6 months post-clip versus MitraClip cohort, reduced MR grade (1.8 ± 0.8 vs 3.0 ± 0.6, P = 0.003), increased CO (3.9 ± 1.3 vs 3.3 ± 1.0 l/min, P = 0.042) and a trend towards lower SPAP (30 ± 11 vs 33 ± 10 mmHg, P = 0.10) was found. Symptomatic benefit, defined as New York Heart Association class improvement ≥ 1 grade, occurred in 17/26 patients (65%, responders), while 9/26 did not improve (35%, non-responders). SPAP at rest was more reduced in responders versus non-responders (-9.5 ± 10.1 vs + 2.4 ± 10.4 mmHg, P = 0.016) for a similar CO at rest (4.0 ± 1.5 vs 3.6 ± 0.9 l/min, P = 0.4).

During exercise 6 months post-clip versus MitraClip cohort, higher workload (69 ± 26 vs 58 ± 24 Watt, P = 0.036), trend towards higher peak CO (6.4 ± 2.9 vs 5.4 ± 1.7 l/min, P = 0.065) and a similar peak SPAP (39 ± 11 vs 43 ± 11 mmHg, P = 0.13) were found. Higher SPAP was associated with lower exercise-induced myocardial strain (59 ± 10 vs 64 ± 11%, P = 0.001), lower peak E/E’ ratio (8.3 ± 3.8 vs 9.3 ± 3.5, P = 0.044).

Conclusion: Symptomatic benefit 6 months after MitraClip therapy was associated with improved hemodynamics both at rest and during exercise.
Background: High-sensitivity cardiac troponin testing is used to detect myocardial damage in patients with acute chest pain. Heart-type fatty acid binding protein (H-FABP) may be an alternative, available as point-of-care test.

Methods: Patients (n = 203) referred by general practitioners for suspected acute coronary syndrome (ACS) or presenting with typical chest pain and one major cardiovascular risk factor at the emergency department were prospectively included in a single-center cohort study. High-sensitivity cardiac troponin I (hs-TnI) and point-of-care H-FABP testing were concomitantly performed at admission and after 6h.

Results: Maximal hs-TnI levels above the 99th percentile were observed in 152 patients (75%) with 127 (63%) fulfilling criteria for myocardial infarction. Upon admission, hs-TnI and H-FABP were associated with an AUC (95%CI) of 0.83 (0.77-0.89) and 0.79 (0.73-0.85), respectively, to predict myocardial infarction, which increased to 0.93 (0.90-0.97) and 0.88 (0.84-0.93), respectively, after 6h. The diagnostic accuracy for non-ST-segment elevation myocardial infarction was somewhat lower with AUCs (95%CI) of 0.80 (0.72-0.87), 0.90 (0.84-0.96), 0.73 (0.64-0.81), and 0.77 (0.67-0.86), respectively. When assessment was performed within 3h of chest pain onset, diagnostic accuracy of H-FABP versus hs-TnI was similar (Figure). Each standard deviation increase in admission H-FABP was associated with a 68% relative risk increase of all-cause mortality (P-value = 0.027) during 666 ± 155 days of follow-up.

Conclusions: Point-of-care H-FABP testing has lower diagnostic accuracy compared to hs-TnI assessment in patients with high pre-test ACS probability, but might be of interest when assessment is possible early after chest pain onset. Point-of-care H-FABP testing has lower diagnostic accuracy compared to hs-TnI assessment in patients with high pre-test ACS probability, but might be of interest when assessment is possible early after chest pain onset.