Abstract sessies Online NVVC Najaarscongres
Donderdag 5 en vrijdag 6 november 2020

Sessie 1 Electrophysiology and devices

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Different Pathophysiological Mechanisms in Women and Men with Short-lasting Atrial Fibrillation

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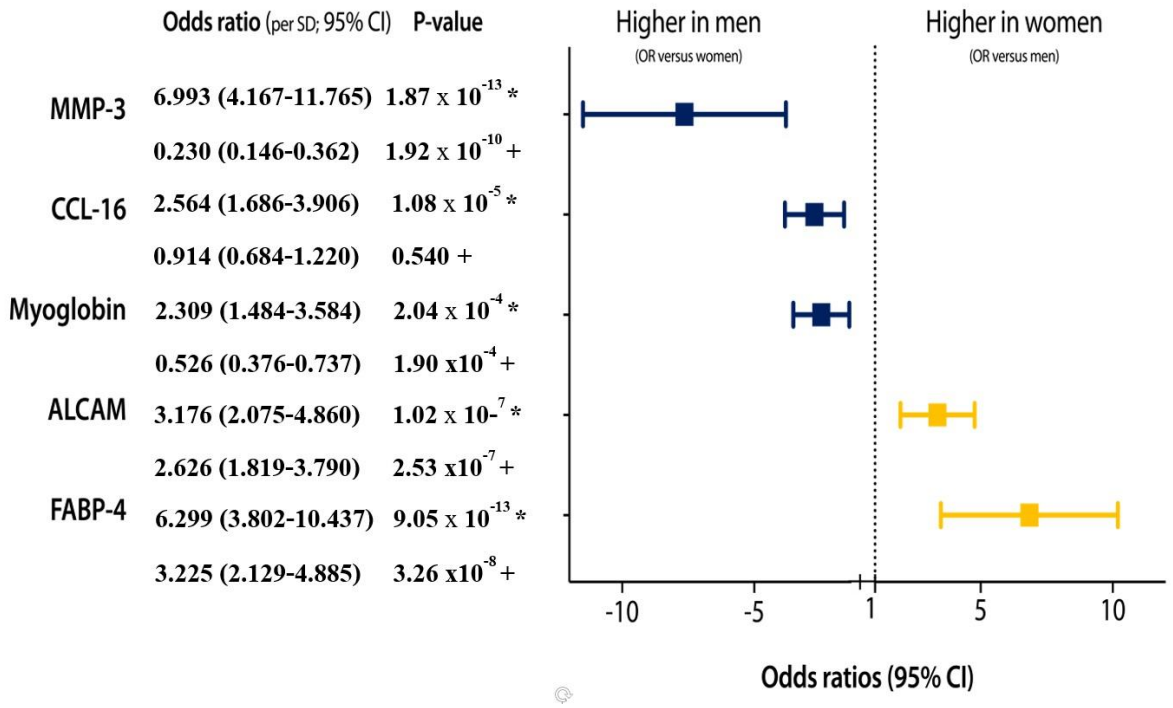
Purpose:
Development of atrial fibrillation(AF) is driven by risk factors, underlying cardiovascular diseases, and AF itself. The clinical risk profile of AF patients, however, is different in women and men. Our aim is to identify sex differences in blood biomarkers in patients with AF.
Methods:
Sex differences in 92 blood biomarkers(Proseek® Olink Cardiovascular III panel) were measured in two well-phenotyped AF cohorts: in 384 patients from our discovery cohort, AF-RISK study; and subsequently in 188 patients from our validation cohort, RACE-V study. Blood biomarkers were assessed using multivariable logistic regression.
Results:
In the discovery cohort, mean age was 59±12 years, 155(40%) were women and 364(95%) had paroxysmal AF. A total of 194(51%) had heart failure, 182(47%) hypertension and 27(7%) coronary artery disease. Women were older (61±10 vs. 58±12 years, p<0.036); men had more heart failure (55% vs. 44%, p<0.037). In the validation cohort, characteristics were comparable. Levels of activated leukocyte cell adhesion molecule(ALCAM, involved in leukocyte recruitment in case of tissue damage) and fatty acid binding protein-4(FABP-4, involved in fatty acid metabolism) were higher in women, (p<1.02E-7 and p<9.05E-13 respectively) . Matrix metalloproteinase-3(MMP-3, involved in vascular remodelling), C-C motif chemokine-16(CCL-16, involved in inflammatory processes), and myoglobin(a marker of muscle degradation) were higher in men (p<1.87E-13, p<1.08E-5 and p<2.04E-4 respectively). All, except CCL-16, were confirmed in the validation cohort.
Conclusion:
In people with short-lasting AF, inflammatory biomarkers were more often higher in women, while biomarkers for vascular remodelling were more often higher in men. Our data suggest that pathophysiological mechanisms in women and men with AF may differ.

Keywords:
atrial fibrillation,, sex differences, biomarkers

Figure:
* values from discovery cohort + values from validation cohort



In-vivo Validation of Noninvasive Epicardial and Endocardial Multi-wave Based Inverse Electrocardiography

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Purpose:
Inverse electrocardiography (iECG) during sinus rhythm in individuals with cardiomyopathy may improve risk stratification for sudden cardiac death. However, iECG is complicated by multiple simultaneous endocardial activation waves (multi-wave) mediated by the His-Purkinje system. To improve accuracy, equivalent double layer based iECG was supplemented with electrophysiological knowledge of the His-Purkinje system. Multi-wave iECG local activation timing (LAT) maps and invasive LAT maps during sinus rhythm were quantitatively compared.
Methods:
Thirteen patients referred for invasive electro-anatomical mapping (EAM) of the endocardial and epicardial surface were included. Prior to EAM, each subject underwent 64-lead body surface potential mapping (BSMP), cardiac CT and electrode 3D imaging whereof anatomical models were created (Figure, Panel A-B). Electro-anatomical structures associated with initial endocardial ventricular activation were incorporated in the ventricular model (Figure, Panel C) and multiple simultaneous activation waves were simulated. Invasive EAM LAT maps were quantitatively compared to iECG LAT maps (Figure, Panel D) using inter-map correlation coefficients (CC, Pearson's) and absolute differences (AD).
Results:
Mean inter-map CC and AD were 0.54±0.19 and 18±7 ms respectively for the epicardial surface (n=13). Similar to the RV endocardial surface (n=10, CC=0.50±0.29, AD=20±8 ms) and the LV endocardial surface (n=4, CC=0.44±0.26, AD=25±7 ms).
Conclusion:
Quantitative validation of the multi-wave iECG method showed overall good performance. This novel iECG method provides a physiologically realistic and robust estimation of sinus rhythm and may serve as a valuable tool for detection of electro-anatomical substrates and risk stratification. Further research will focus on improving the iECG method for structural heart disease and cardiomyopathy.

Keywords:
non-invasive activation mapping, inverse ECG, quantitative validation

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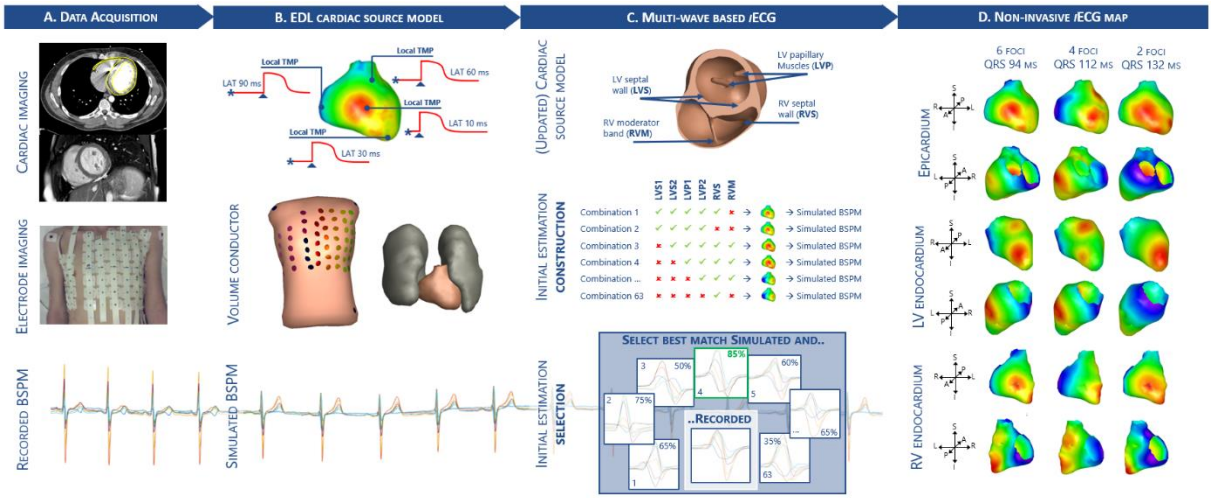
Figure:
In short, the multi-wave iECG method. First, (cardiac) imaging and body surface potential maps (BSPM) data are acquired (A). Local activation timing is depicted from red (early activation) to (blue latest activation). Using the volume conductor, BSPM are simulated. Multi-wave iECG selects the best matching activation sequence by testing 63 combinations of initial activation sequences. The output of the procedure is local activation timing maps (D). In Panel D, three examples of the 63 possible activation maps are shown with respectively six, four or two initial sites of activation.



Mortality among CIED Patients during the COVID-19 Pandemic in the Netherlands

Presenting author: M. Feijen
Department: Cardiologie

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Purpose:
During the peak of the pandemic, COVID-19 caused excess mortality nationwide. Chronic heart disease patients are at high risk for complicated course of a COVID-19 infection. We hypothesize that all-cause mortality among Cardiac Implantable Electronic Devices (CIED) patients during the peak of the pandemic was significantly higher as compared to the same period in the previous years.

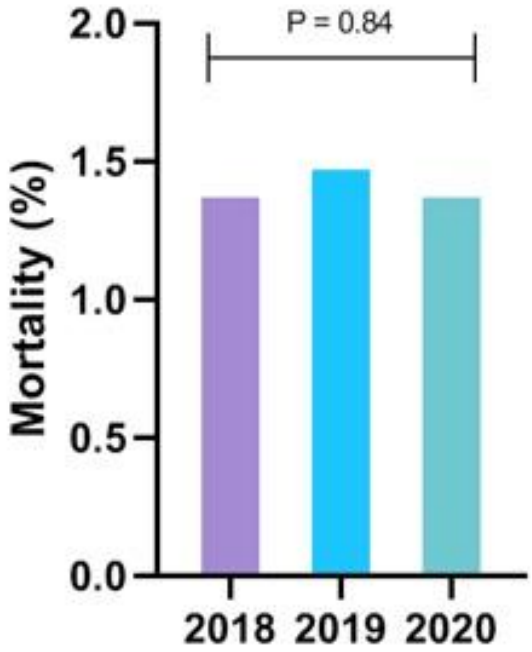
Methods:
Data of all CIED patients under follow-up at the Leiden University Medical Center was analysed. All-cause mortality during the peak of the pandemic (1/3/20-1/6/20) was evaluated and compared to the same period in 2019 and 2018. Minimal sample size was calculated based on mortality in 2018 and 2019, an excess mortality of 50% was expected in our study population. With an α of 5% and a power of 80% at least 2384 patients were required.

Results:
At the beginning of the study period, 3220 CIED patients (Median 70 years; IQR 58-78, 63% male, 41% ischemic heart disease, 6% congenital heart disease) were alive. Baseline characteristics of the CIED patients in 2019 (N=3271) and 2018 (N=3225) were comparable. All-cause mortality during the peak of the pandemic was 1.4% as compared to 1.5% in the same period in 2019 and 1.4% in the same period in 2018 (P=0.84).

Conclusion:
During the peak of the COVID-19 pandemic, there was no excess mortality among CIED patients despite they were at high risk for a complicated cause of the infection. Strict adherence to the preventive measures may have potentially prevented excess mortality in this vulnerable patient group.

Keywords:
CIED patients, COVID-19, mortality

Figure:
Figure 1: Mortality (%) in patients with CIED during 01/03 – 01/06 in the corresponding year. Chi-square test performed to test effect of year on mortality (P = 0.84).



12-lead Electrocardiogram to Distinguish Right-sided Cardiac Sarcoidosis from Arrhythmogenic Right Ventricular Cardiomyopathy

Presenting author: J.C. Hoogendoorn
Department: Cardiology

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Purpose:
Background: Cardiac sarcoidosis (CS) with right ventricular (RV) involvement may mimic arrhythmogenic right ventricular cardiomyopathy (ARVC). Histopathological differences may lead to different activation patterns on the 12-lead electrocardiogram (ECG).
Aim and hypothesis: To determine whether the 12-lead surface ECG can distinguish CS with RV involvement from ARVC. Patchy transmural RV scar in CS may lead to conduction block, and therefore late activated areas with preserved voltages. On the contrary, scar in ARVC progresses from epicardium to endocardium and may lead to delayed activation of areas with reduced voltages.
Methods:
Patients with either 1) CS with RV involvement or 2) gene-positive ARVC referred for VT ablation were retrospectively included. A non-ventricular paced 12-lead surface ECG prior to ablation was obtained (25mm/s and 10mm/mV). The presence and surface area (SA) of the R'-wave (any positive deflection from baseline after an S-wave) in V1-V3 was measured.
Results:
13 CS patients with RV involvement (54±8 years, 62% male) and 23 ARVC patients (37±15 years, 73% male) were included. A R'-wave in V1-V3 was present in all CS patients compared to 48% of ARVC patients (p=0.002). The maximum R'-wave SA in lead V1-V3 was an excellent discriminator between CS and ARVC. An algorithm including the presence of an R'-wave and the maximum R'-wave in V1-V3≥1.65mm2 had 85% sensitivity of 96% specificity for diagnosing CS. This was validated in a second cohort (18 CS and 40 ARVC) with 72% sensitivity and 88% specificity.
Conclusion:
An easily applicable algorithm including the presence and surface area of the largest R'-wave in lead V1-V3≥1.65mm2 distinguishes CS from ARVC with good sensitivity and specificity. These specific ECG features likely reflect different scar patterns.

Keywords:
Cardiac sarcoidosis, Arrhythmogenic right ventricular cardiomyopathy, Electrocardiogram

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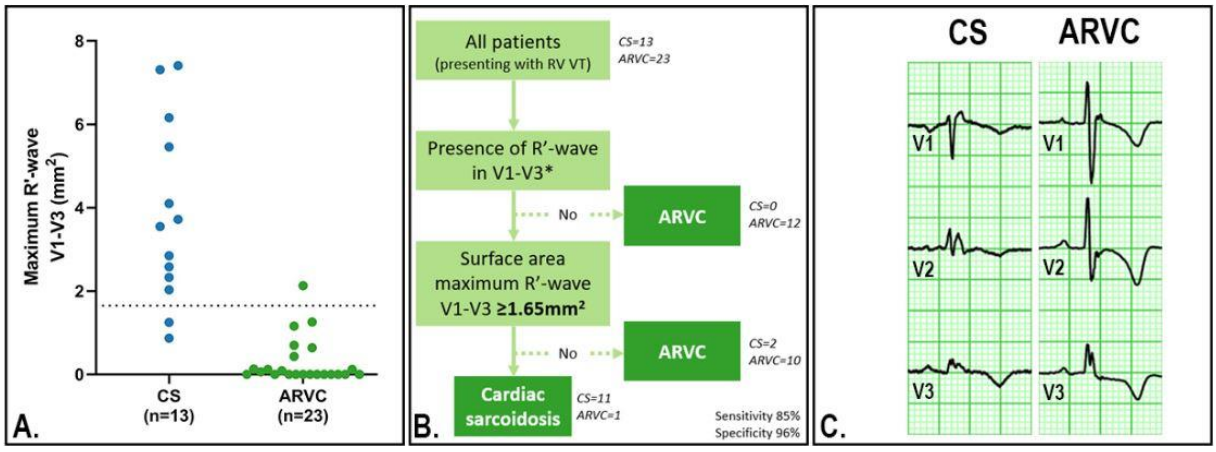
Figure:
A. Maximum surface area (SA) in lead V1-V3 in cardiac sarcoidosis (CS, left) and arrhythmogenic right ventricular cardiomyopathy (ARVC, right). B. 12-lead surface ECG algorithm to distinguish CS from ARVC. C. Examples of the ECG pattern in CS (left) and ARVC (right).



The Diagnostic Yield of Implantable Loop Recorders in Northwest Clinics (The Netherlands): a Retrospective, Single Center Case Study

Presenting author: N.L. Pijnenburg
Department: Cardiology

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Purpose:
Implantable loop recorders (ILR) are a widely used tool in patients with syncope or palpitations, in which the initial workup does not identify a probable cause. The diagnostic yield of ILR varies greatly and is dependent upon the pre-test likelihood of a cardiogenic cause. Our aim was to study the clinical efficacy of ILR in our clinic.
Methods:
All patients with an ILR, who had their device explanted between 1-2013 and 5-2018 in Northwest Clinics (the Netherlands) were studied in retrospect.
Results:
A total of 139 patients were included: 36.7% male, mean age 66 ± 16 years old. In the majority of cases ILR was implanted for (near)syncope (87.1%). In all cases holter (24h at the least) and echocardiography was performed before ILR implantation, in accordance with ESC guidelines. Only 2.9% of patients had LVEF < 40%, and only 2 patients showed a high grade (2/3 degree) AV block pre ILR implantation. In 41.7% of patients a probable or definitive cause was identified leading to a therapeutic intervention (32.4% permanent PM or ICD, 7.2% EP study or ablation, 0.7% both, and 1.4% medication only). This group was significantly older than patients without abnormal ILR findings (71 vs 62 years, $p<0.001$) and regression analysis showed that age was an independent predictor for diagnostic yield (HR 1.8/10year, $p<0.001$). Atrial fibrillation was observed as a coincidental finding in 8% of the total population.
Conclusion:
ILR lead to diagnosis and initiation of therapy in nearly half of patients with unexplained syncope or palpitations, with its incidence increasing significantly in older age.

Keywords:
implantable loop recorders, syncope, devices

Outcomes for Edoxaban-users with Atrial Fibrillation in Belgian and Dutch clinical practice: The First Year of Follow-up of ETNA-AF-Europe

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Purpose:
Previous analyses of Edoxaban Treatment in routiNe clinical prActice for patients with Atrial Fibrillation in Europe (ETNA-AF-Europe) show that the patients from Belgium and the Netherlands (BeNe) were less often initiated on 30 mg edoxaban, and previously diagnosed with hypertension and/or diabetes mellitus than those from the other European countries (OEC). It is unclear how these baseline differences affect thromboembolism and bleeding rates during follow-up.

Methods:
With data from the first of four years follow-up from ETNA-AF-Europe, a large prospective observational study, we compared rates of bleeding, thromboembolism, and death of patients from BeNe with those from the OEC.

Results:
Of all 13224 (94.6% of all enrolled patients) with a complete dataset, 2548 were from BeNe. In total, 71 (2.90%/year) patients in BeNe experienced a major or clinically relevant non-major bleed compared with 227 (2.21%/year) in OEC, 13 (0.52%/year) and 20 (0.19%/year) of which were intracranial haemorrhages, respectively. In BeNe, 27 (1.09%/year) patients developed a stroke or systemic embolism vs. 76 (0.73%/year) in OEC. Seventy-three (2.94%/year) patients died during follow-up in BeNe, compared with 374 (3.60%/year) in OEC.

Conclusion:
Rates of thromboembolism, bleeding, and death were low in unselected patients with atrial fibrillation treated with edoxaban. Thromboembolisms and bleeds, but not all-cause deaths, were numerically more often reported in BeNe than in EC. These differences warrant further study.

Keywords:
atrial fibrillation, edoxaban, phase IV

Figure:

Outcomes during the first year of follow-up in ETNA-AF-Europe

	Belgium and the Netherlands			Other European Countries		
Outcomes	**Any dose**	**60 mg**	**30 mg**	**Any dose**	**60 mg**	**30 mg**
Patients - N (%)	2548 (100.0)	2167 (85.0)	381 (15.0)	10676 (100.0)	7943 (74.4)	2733 (25.6)
Bleed - N (%/year)						
- Major	26 (1.05)	23 (1.09)	3 (0.82)	110 (1.07)	65 (0.84)	45 (1.74)
- Major/CRNM	71 (2.90)	59 (2.82)	12 (3.34)	227 (2.21)	144 (1.87)	83 (3.23)
- Intracranial	13 (0.52)	11 (0.52)	2 (0.55)	20 (0.19)	15 (0.19)	5 (0.19)
- Major/CRNM GI	28 (1.13)	24 (1.14)	4 (1.10)	104 (1.01)	57 (0.74)	47 (1.82)
Thromboembolism - N (%/year)						
- S/SE	27 (1.09)	24 (1.14)	3 (0.83)	76 (0.73)	51 (0.66)	25 (0.96)
- Any stroke	26 (1.05)	23 (1.09)	3 (0.83)	69 (0.67)	48 (0.62)	21 (0.81)
- Ischaemic stroke	17 (0.69)	15 (0.71)	2 (0.55)	55 (0.53)	37 (0.48)	18 (0.69)
Death - N (%/year)						
- All-cause	73 (2.94)	51 (2.41)	22 (6.03)	374 (3.60)	184 (2.37)	190 (7.29)
- Cardiovascular	29 (1.17)	20 (0.94)	9 (2.47)	180 (1.73)	91 (1.17)	89 (3.41)

CRNM clinically relevant non-major; *GI* gastrointestinal; *S/SE* composite of any stroke and systemic embolism.