Abstracts of the Scientific Spring Congress of the Netherlands Society of Cardiology 16 - 17 April 2026

16 - 17 April 2026
1931 Congrescentrum 's-Hertogenbosch

Session 1: EFO & devices
Abstract 1

Dutch Outcome in Implantable Cardioverter-Defibrillator Therapy – Extended Follow Up (DO-IT-XL): Long-Term Outcomes in a Large Primary Prevention Population

Presenting author: J.L.M. Römers
Department: Cardiology

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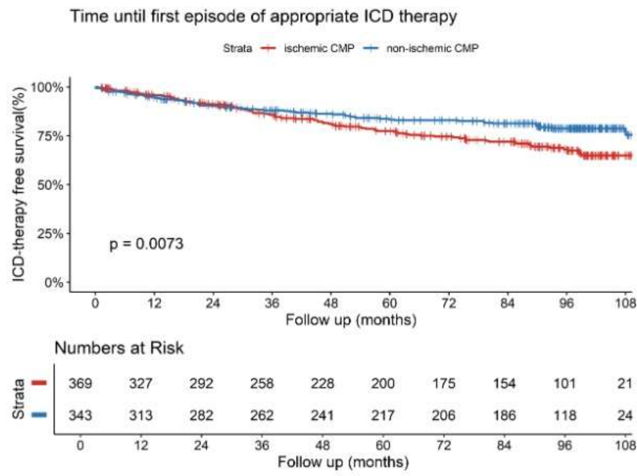
Purpose:
Guidelines are shifting toward more conservative ICD use, especially in non-ischemic cardiomyopathy. We aimed to evaluate long-term outcomes, including survival and ICD-related events, across all ICD implantation indications.
Methods:
This study presents the extended follow-up of the multicenter Dutch DO-IT study, with endpoints including overall survival, (in)appropriate ICD therapy, and device-related complications.
Results:
Of the initial cohort, 759 patients (mean age 67± 11 years, 29.9% female) were included in this analysis. Cardiomyopathy (CMP) etiology was ischemic CMP (iCMP) in 52.6%, hypertrophic CMP in 3.7%, dilated CMP in 6.9%; Idiopathic CMP in 23.3%, genetic CMP in 4.1% and other non-ischemic CMP (niCMP) in 9.5 %. During a median follow-up of 7.5 years [IQR 4.1; 8.4], 38.3% of patients died (iCMP 45.1% vs. niCMP 30.8%, $p < 0.001$), with 66.2% of deaths due to non-cardiac causes. Cardiac deaths were mostly due to heart failure, with few arrhythmic deaths (iCMP n = 7, niCMP n = 1). During follow-up, 189 patients (26.5%) received appropriate ICD therapy (iCMP 26.1 %, niCMP 23.6%, $p = 0.486$). The annual rate of appropriate therapy was 8.56% for iCMP and 5.76% for niCMP, while the annual rate for inappropriate therapy was 1.3% in both groups. Complication rates during follow-up did not differ between groups.
Conclusion:
Extended follow-up shows that even in modern times with more contemporary heart failure therapy, appropriate ICD therapy is frequently needed in primary prevention ICD recipients. The high annual rate of appropriate ICD therapies in our cohort warrants reconsideration to withhold an ICD in patients with niCMP

Keywords:
Defibrillator, Cardiomyopathy, Long-term outcome

Figure:
Time until first episode of appropriate ICD therapie



Session 1: EFO & devices
Abstract 2

Comparison of Two Pulsed Field Ablation Systems for Atrial Fibrillation: One-Year Outcomes from a Multicenter Registry

Presenting author: M. van der Graaf
Department: Cardiology

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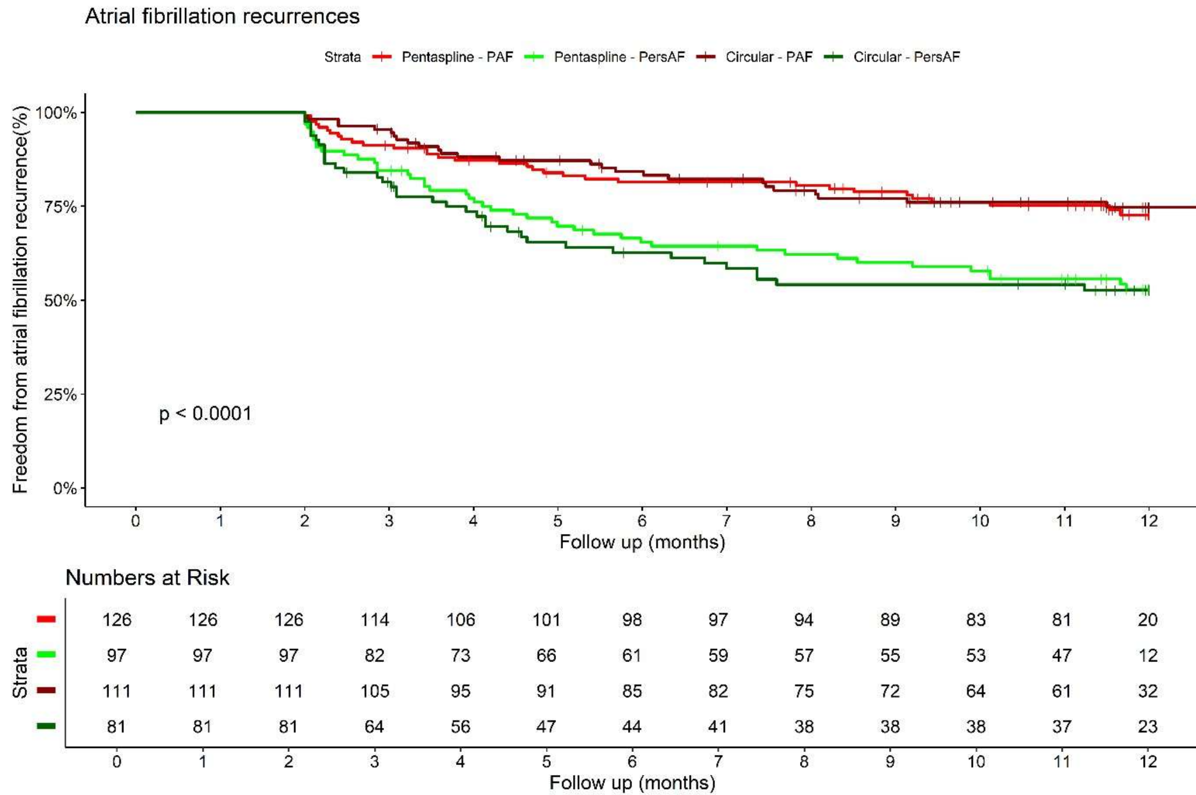
Purpose:
While various pulsed field ablation (PFA) systems for atrial fibrillation (AF) ablation have become available in recent years, data comparing long-term efficacy outcomes remain limited.
The goal of this study is to compare long-term efficacy outcomes of two commercially available PFA systems to perform pulmonary vein isolation (PVI) for AF in a multicenter clinical setting.
Methods:
We conducted an international, multicenter, registry study of patients with AF undergoing a first ablation between January 29th, 2024 and September 1st, 2024. Patients were treated with either the pentaspline catheter or the circular over-the-wire catheter in all centers. Endpoints included time to recurrence of atrial arrhythmias following a 2-month blanking period and repeat ablation outcomes. Factors associated with recurrence were assessed.
Results:
A total of 428 patients were included, of whom 231 (54.0%) were treated with the pentaspline catheter. Most patients (84.6%) underwent a PVI-only procedure, with significantly longer procedure and LA dwell times observed in the circular catheter group ($p < 0.001$). Acute procedural success was achieved in all patients. At 12 months, AF-recurrence was observed in 33.5% of patients overall, with similar rates between groups (pentaspline catheter 34.1% vs. circular catheter 32.8% (log-rank $p = 0.93$)). Longer time since AF diagnosis and persistent AF were associated with recurrence of AF. Repeat ablation was performed in 14.9% of patients.
Conclusion:
In this study, we compared two commercially available PFA systems for primary PVI in AF patients. Both achieved high acute success and similar 12-month AF recurrence rates, indicating comparable efficacy.

Keywords:
Atrial fibrillation, Pulsed Field Ablation, Long-term Efficacy

Figure:
Figure 1: Kaplan meier curve - Recurrence of atrial fibrillation by ablation method and type of AF



Session 1: EFO & devices
Abstract 3

Retrospective Evaluation of the Prostyle Vascular Closure Device in Patients Undergoing Atrial Fibrillation Ablation: Effects on Hemostasis and Hospital Stay

Presenting author: I.N. Bax
Department: Cardiology

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Purpose:
Pulmonary vein isolation (PVI) for atrial fibrillation (AF) carries bleeding risks and subsequent long bed rest. Vascular closure devices (VCDs) may reduce bleeding and enable earlier mobilization. This study evaluates strategies to minimize access-site bleeding and shorten hospitalization.
Methods:
This single-center registry included patients with AF undergoing a (re-)PVI between April 3rd and October 28th, 2025, at St. Antonius Hospital, the Netherlands. The registry included three phases: phase 1 used a VCD for femoral access (≥8F, outer diameter 12-17F) followed by 4h bed rest, phase 2 applied the same VCD with 2h bed rest plus 2h seated, phase 3 combined VCD and figure-of-eight suture, followed by 2h bed rest and 1h seated/semi-upright. Outcomes included access-site bleeding complications, same-day discharge and post-procedure length of stay.
Results:
In total 461 patients were included (phase 1: 170; 2: 240; 3: 51) with a mean age of 63.7 ± 9.7 years, 35.4% were female. Baseline characteristics were comparable across all phases. No major bleeding complications occurred. Minor bleeding occurred in 33 patients (19.4%), 49 (20.4%), 4 (7.8%) in phases 1, 2, and 3, respectively, with no statistically significant difference (p = 0.106). Prolonged bed rest occurred in 29 (17.2%), 103 (42.9%), and 10 (19.6%) patients, respectively. Unplanned overnight stay due to bleeding was required in 0 (0%), 6 (2.5%), and 0 (0%) patients, respectively.
Conclusion:
Implementation of a VCD reduced bed rest after PVI from 4 to 2 hours, with a slight increase in minor bleeding complications. By adding a figure-of-eight suture we enabled higher same-day discharge rates.

Keywords:
Catheter ablation, vascular closure device,

Figure:

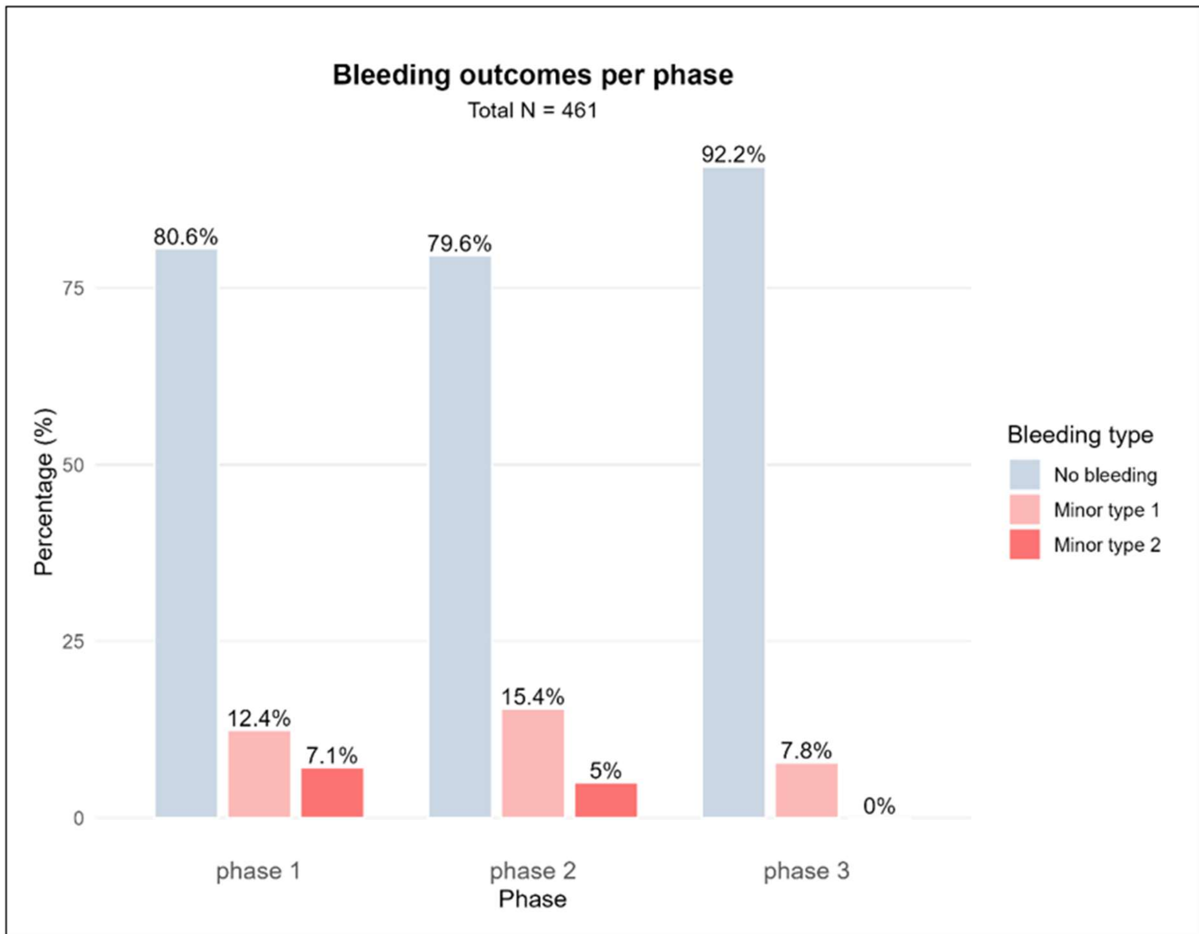

Figure 1. Bleeding outcomes after femoral access-site closure per phase

Session 1: EFO & devices
Abstract 4

Extensive vs. Limited Pulmonary Vein Isolation in Pulsed Field Ablation Using a Circular Over-the-wire Catheter

Presenting author: R.E. Bolhuis
Department: Cardiology

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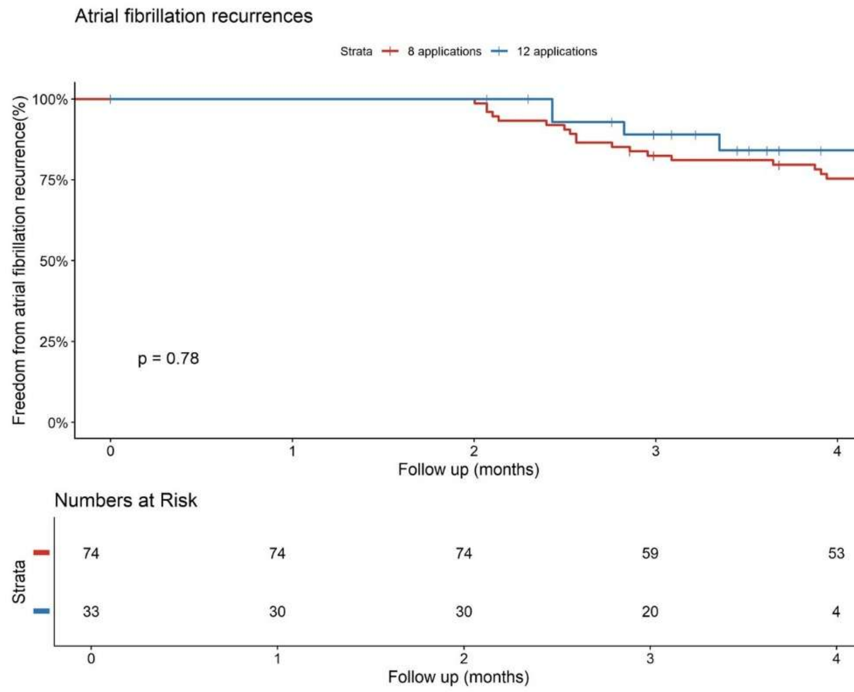
Purpose:
Despite favorable short-term PVI outcomes with PulseSelect (PS) pulsed field ablation (PFA) system, long-term results are still limited. This study compares 8 versus 12 applications to assess durability, efficacy, and safety.
Methods:
Single-center registry of patients with paroxysmal or non-paroxysmal atrial fibrillation (AF) undergoing primary pulmonary vein isolation (PVI) using the PS PFA system at St. Antonius Hospital (March–September 2025). According to local protocol, patients treated before 20 June 2025 received ≥8 applications per vein (8-application group), after which the protocol was changed to ≥12 applications per vein (12-application group). Endpoints included acute isolation, adverse events, and AF recurrence after a 2-month blanking period, monitored by photoplethysmography or electrocardiograms and analyzed using Kaplan–Meier curves and log-rank tests.
Results:
This analysis included 115 patients (65.9% male; mean age 64 years; 69.6% paroxysmal AF), all undergoing PVI only. Seventy-five patients were included in the 8-application group and 40 in the 12-application group. The 12-application group received more applications (48.0 vs 34.0), had longer procedure duration (42.5 vs 36.0 min, $P<0.001$) and fluoroscopy times (13.0 vs 10.0 min, $P<0.001$). Acute isolation was achieved in 100% vs 97.3%. Two minor and one major vascular complication occurred in the 8-application group. Arrhythmia recurrence did not differ significantly between groups ($P=0.78$), with a non-significant trend toward higher short-term AF freedom in the 12-application group.
Conclusion:
In this preliminary cohort, 12 versus 8 applications per pulmonary vein showed similar acute efficacy and safety, with a non-significant trend favoring 12 applications. Larger cohorts and longer follow-up will allow more robust evaluation.

Keywords:
Pulsed Field Ablation, Pulmonary Vein Isolation, Atrial Fibrillation

Figure:



Session 1: EFO & devices
Abstract 5

Early Real-World Outcomes of the 2023 Refined Dutch Guidelines for Non-Ischemic Cardiomyopathy Mandating CRT-P Treatment

Presenting author: L.A. Broers
Department: Cardiology

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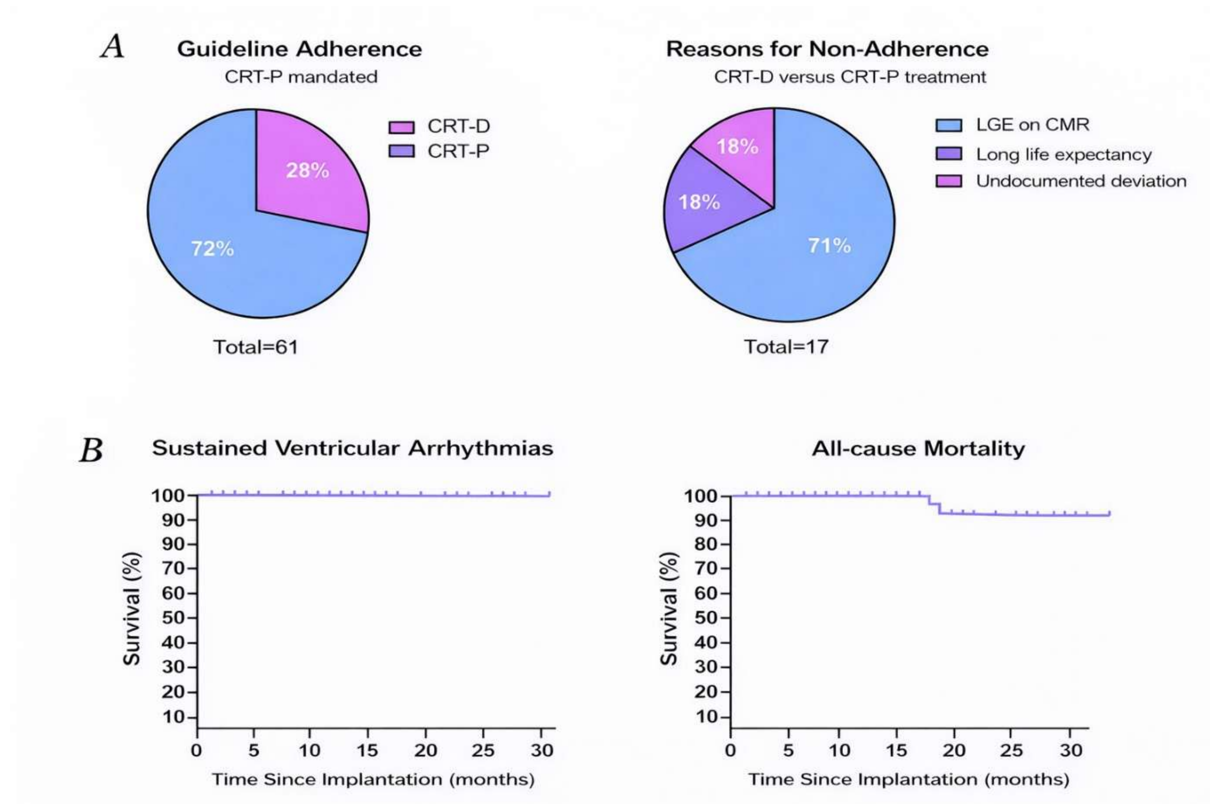
Purpose:
To evaluate real-world adherence of the 2023 Dutch guidelines for patients with non-ischemic cardiomyopathy (NICM) undergoing de novo CRT implantation, recommending cardiac resynchronization therapy without (CRT-P) rather than with defibrillator (CRT-D), and to assess ventricular arrhythmia and mortality outcomes.
Methods:
A retrospective multicenter cohort study was conducted across two academic hospitals in the Netherlands. Consecutive adult patients with NICM, left ventricular ejection fraction <35% despite ≥3 months of guideline-directed medical therapy, and CRT implanted between April 2023 and January 2026 were included. Patients with ischemic cardiomyopathy, secondary-prevention ICD indications, prior device implantation, infiltrative cardiomyopathies, or known high-risk genetic variants for sudden cardiac death were excluded. Outcomes included guideline adherence, reasons for non-adherence, sustained ventricular arrhythmias during follow-up, and all-cause mortality.
Results:
A total of 61 patients were included. Most patients (72%) received CRT-P in accordance with the Dutch guideline, while 28% received CRT-D. Reasons for non-adherence included the presence of late gadolinium enhancement (LGE) on cardiac magnetic resonance (CMR) imaging (71%), long remaining life expectancy (18%), or undocumented deviation from the guideline (12%). During a median follow-up of 12 months (range: 0-31 months), no sustained ventricular arrhythmias were observed. Two patients died of a non-cardiovascular and undocumented event.
Conclusion:
In this real-world multicenter cohort, adherence of the guideline in selected patients was moderate. Particularly those with myocardial fibrosis on CMR continued to receive CRT-D, reflecting ongoing debate in arrhythmic risk prevention in NICM. No sustained ventricular arrhythmias were observed.

Keywords:
Non-Ischemic Cardiomyopathy, Guideline Adherence, Cardiac Resynchronization Therapy

Figure:
Figure: A. 2023 Dutch NICM guidelines adherence and reasons for non-adherence. B. Outcomes on sustained ventricular arrhythmia during follow-up and all-cause mortality.



Session 1: EFO & devices
Abstract 6

Clinical and Economic Evaluation of Obstructive Sleep Apnea Screening in Patients with Atrial Fibrillation: A Screening-to-Care Cascade Analysis

Presenting author: Y. el Ousrouti
Department: Cardiology

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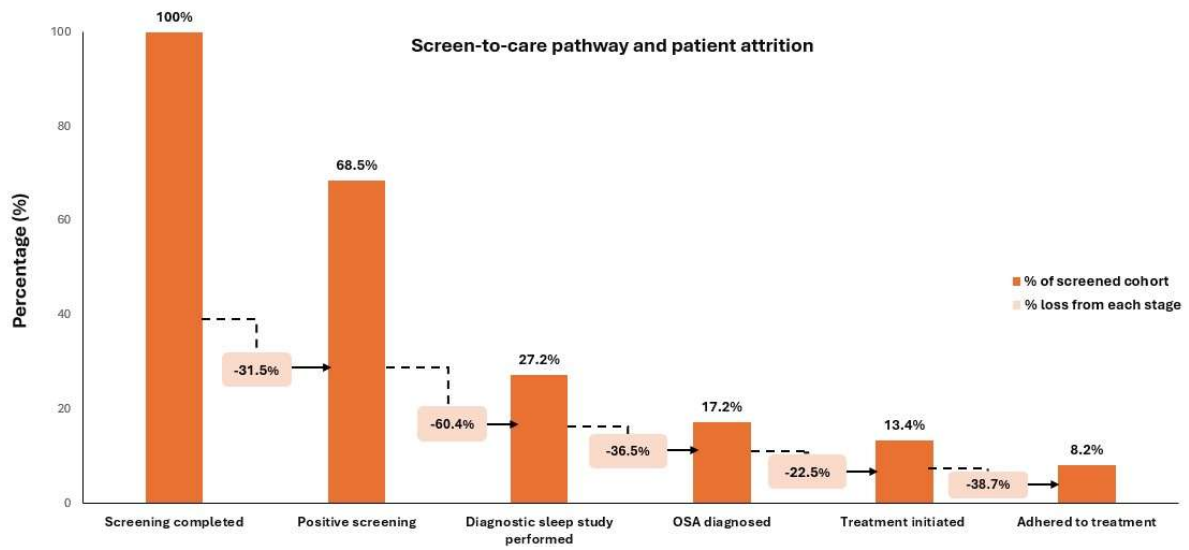
Purpose:
Obstructive sleep apnea (OSA) is highly prevalent yet often underdiagnosed in patients with atrial fibrillation (AF). Despite this, data on the clinical and economic value of systematic OSA screening in this population are lacking. This study investigated patient attrition and direct medical costs in an AF outpatient cohort using a screening-to-care cascade model.
Methods:
This retrospective cohort study with longitudinal follow-up examined AF patients presenting to an AF outpatient clinic between 2019 and 2023. OSA screening utilised the STOP-BANG alongside clinical evaluation. Patient flow was tracked across sequential stages: screening, diagnostic sleep study, OSA diagnosis, treatment initiation, and adherence, with adherence assessed through a cross-sectional questionnaire. Direct medical costs for each cascade step were analysed from a healthcare system perspective.
Results:
Screening was conducted in 232 AF patients (age 64.7±9.6 years, 65.3% male). Of these, 159 (68.5%) screened positive for OSA and were referred for diagnostic testing. 63 (39.6% of screen-positives) underwent a sleep study, resulting in 40 new OSA diagnoses. Ultimately, 31 patients initiated treatment, and 19 (8.2% of all screened) remained adherent. The largest attrition occurred between positive screening and diagnostic testing, with 60.4% not proceeding. The total cost from screening through treatment was €192,397.39, corresponding to €10,125.12 per adherent patient.
Conclusion:
Systematic screening detected many AF patients at risk for OSA but was marked by high attrition during the diagnostic phase, limiting confirmed diagnoses and adherence. Targeted strategies to improve diagnostic uptake and long-term adherence are needed to increase the clinical yield of screening.

Keywords:
Obstructive Sleep Apnea (OSA), Atrial Fibrillation (AF), Screening

Figure:
Figure 1. Screen-to-care pathway showing the proportion of patients progressing through each step, expressed as a percentage of the screened cohort and the relative attrition between consecutive stages.



Session 1: EFO & devices
Abstract 7

Early Rhythm Transitions After Post-First-Shock Asystole in Witnessed Out-of-Hospital Cardiac Arrest

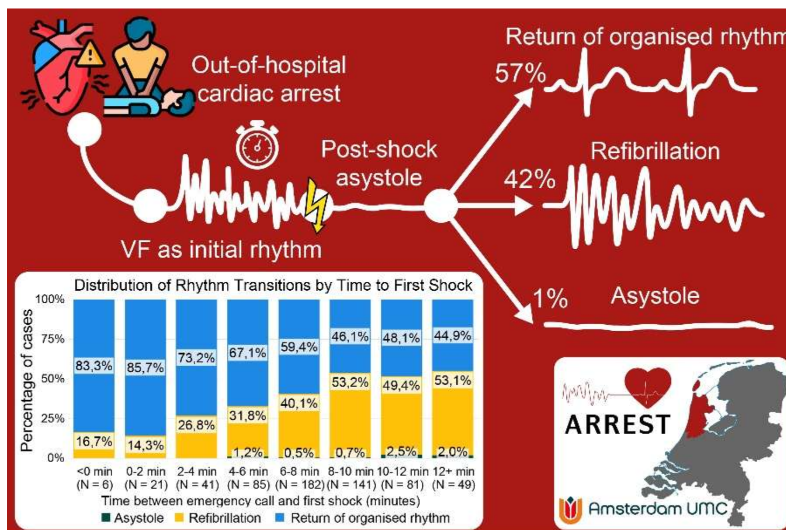
Presenting author: A. Bakker
Department: Cardiology

A. Bakker (Amsterdam UMC, Amsterdam); A. Bakker; B.J. Verkaik; R. Stieglis; J.L. van Schuppen; C. van der Werf (Amsterdam UMC Location AMC, Amsterdam)

Purpose:
Early defibrillation improves survival in out-of-hospital cardiac arrest (OHCA) patients presenting with initial shockable rhythms. However, approximately 55% of patients exhibit asystole directly after the first shock. Here, we studied early rhythm transitions in these post-first-shock asystole patients to determine whether post-shock pacing could be beneficial.
Methods:
We included 606 accurately characterized witnessed OHCA cases with an initial shockable rhythm between 2016-2019 and asystole within five seconds post-first-shock. Rhythm transitions were classified as return of organized rhythm (ROOR) or refibrillation (reoccurrence of ventricular fibrillation). Shock delay was defined as time from emergency call to the first shock.
Results:
Post-first-shock asystole persisted in 6/606 (1%) cases. ROOR and refibrillation occurred as first transition in 344/606 (57%) and 256/606 (42%) cases, respectively. Each additional minute of shock delay significantly reduced the likelihood of ROOR (adjusted odds ratio [aOR] 0.92; 95% CI 0.87-0.97) and significantly increased the likelihood of refibrillation (aOR 1.07; 95% CI 1.00-1.15) as the first rhythm transition. Median time to ROOR was 18 seconds (IQR 11-34) in cases with shock delay <6 minutes and 26 seconds (IQR 15-71) in those with ≥6 minutes (P<0.001). Thirty-day survival was 63% in patients with ROOR and 29% in patients with refibrillation as the first rhythm transition (P<0.001).
Conclusion:
Post-first-shock asystole was transient in nearly all cases of witnessed out-of-hospital cardiac arrest. These findings suggest that post-shock pacing has no significant potential to improve outcome. Subsequent rhythm transitions were significantly influenced by shock delay, stressing the importance of implementing and improving strategies to reduce the time to first shock.

Keywords:
out-of-hospital cardiac arrest, defibrillation, post-first-shock asystole

Figure:
This graphical abstract illustrates witnessed out-of-hospital cardiac arrests with a shockable initial rhythm, followed by post-first-shock asystole and the subsequent early rhythm transitions. The upper panel shows that post-first-shock asystole persisted in only 1% of patients, while the first transition was a return of organised rhythm in 57% and refibrillation in 42% of cases. The stacked bar chart displays the distribution of these first rhythm transitions by time from emergency call to first shock in 2 minute intervals (plus a ‘shock before call’ category) after post-first-shock asystole. The figure highlights that with increasing shock delay, the proportion of patients with a first transition to return of organised rhythm decreases, whereas the proportion with refibrillation as first transition increases.



Session 1: EFO & devices
Abstract 8

Wearable-Based Automated Cardiac Arrest Detection: Algorithm Performance in Shockable and Non-Shockable Cardiac Rhythms

Presenting author: C.E. Jansen
Department: Cardiology

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Purpose:
Unwitnessed out-of-hospital cardiac arrest (OHCA) has poor survival chances due to delayed recognition. To enable early detection, a wrist-worn device with automated cardiac arrest detection and alerting capabilities is being developed. This study evaluates the performance of a previously developed photoplethysmography (PPG)–based cardiac arrest detection algorithm in patients with shockable and non shockable cardiac arrests in a hospital setting.

Methods:
The study population consisted of patients who underwent ventricular fibrillation (VF) induction during S ICD implantation, VF induction during ventricular tachycardia (VT) ablation, and Intensive Care Unit (ICU) patients in whom life sustaining treatment was withdrawn. Patients wore a PPG wristband (CardioWatch, Corsano Health, Den Haag). Cardiac arrest was confirmed by ECG and invasive blood pressure measurements as reference. Sensitivity for detecting cardiac arrest and false positives were assessed using the previously developed algorithm.

Results:
Twenty-five patients were included (1 VT ablation, 6 S ICD implantation, and 18 ICU patients). In total, these patients experienced 27 cardiac arrests: 9 VF and 18 PEA/asystole. The algorithm correctly identified all 27 arrests, resulting in a sensitivity of 100% (95% CI 87–100%). Three false positive alarms occurred during 140 hours of PPG recordings, of which two in ICU patients and one during the VT ablation procedure.

Conclusion:
Both shockable and non-shockable cardiac arrest were detected with excellent sensitivity. For the first time, this study demonstrates that the cardiac arrest detection algorithm performs equally well in shockable and non-shockable rhythms. Further studies are warranted to evaluate algorithm performance in larger cohorts and under real-world, daily-life conditions.

Keywords:
Out-of-hospital cardiac arrest, Wearable, Automated detection

Session 2: Imaging & diagnostics
Abstract 1

Stroke 6 Weeks after TAVI; Valve Thrombosis?

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Purpose:
Stroke is a serious complication after TAVI, with risk remaining elevated for up to two years. Long-term stroke risk in TAVI patients may be linked to valve thrombosis, yet this is rarely screened for after stroke. This warrants attention.
Methods:
A patient with severe symptomatic aortic stenosis underwent TAVI using a supra-annular self-expanding valve. Septal hypertrophy caused multiple valve pop-outs during the procedure, so definitive deployment was intra-annular. Although the valve was underexpanded, no post-dilatation was performed due to concern for valve migration. Six weeks after TAVI, the patient experienced sudden hemiparesis, partially resolving spontaneously. Brain CT showed no acute lesions. Etiological screening revealed no arrhythmias or carotid pathology. Antiplatelet therapy was intensified with clopidogrel alongside aspirin. The patient was discharged the same day with only mild residual motor deficits.
Results:
Eight weeks after TAVI, follow-up echocardiography showed elevated transvalvular gradients despite normal leaflet motion. Given the elevated gradients in combination with a recent stroke, suspicion of valve thrombosis was raised. Cardiac CT revealed extensive hypoattenuated leaflet thickening with reduced leaflet motion, consistent with valve thrombosis. Antiplatelet therapy was replaced by full-dose apixaban. Five months after TAVI, echocardiography showed normalization of gradients; at one year after TAVI, CT demonstrated only minimal residual thickening. Apixaban was continued as lifelong medication.
Conclusion:
Thrombosis of a TAVI may cause stroke; cardiac CT is the gold standard for diagnosis, elevated echocardiographic gradients can be suggestive, and treatment with a DOAC is often effective.

Keywords:
Stroke, TAVI, Valve Thrombosis

Figure:
Regression of Valve Thrombosis after 9 months Apixaban Treatment.

HLA

9 months Apixaban

HLA

Evolut FX
Evident Valve Thrombosis
3 months after TAVI

Evolut FX
Minimal Valve Thrombosis
12 months after TAVI

RHA

9 months Apixaban

RHA

Session 2: Imaging & diagnostics
Abstract 2

Genetic Architecture, Cardiac Magnetic Resonance Phenotyping, and Outcomes in Dilated and Non-dilated Left Ventricular Cardiomyopathy

Presenting author: A.B.M. Heymans
Department: Cardiology

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Purpose:
To compare clinical, imaging, and genetic characteristics of dilated cardiomyopathy (DCM) and the distinct non-dilated left ventricular cardiomyopathy (NDLVC) phenotype, and identify phenotype-specific predictors of ventricular arrhythmia (VA) and heart failure (HF).

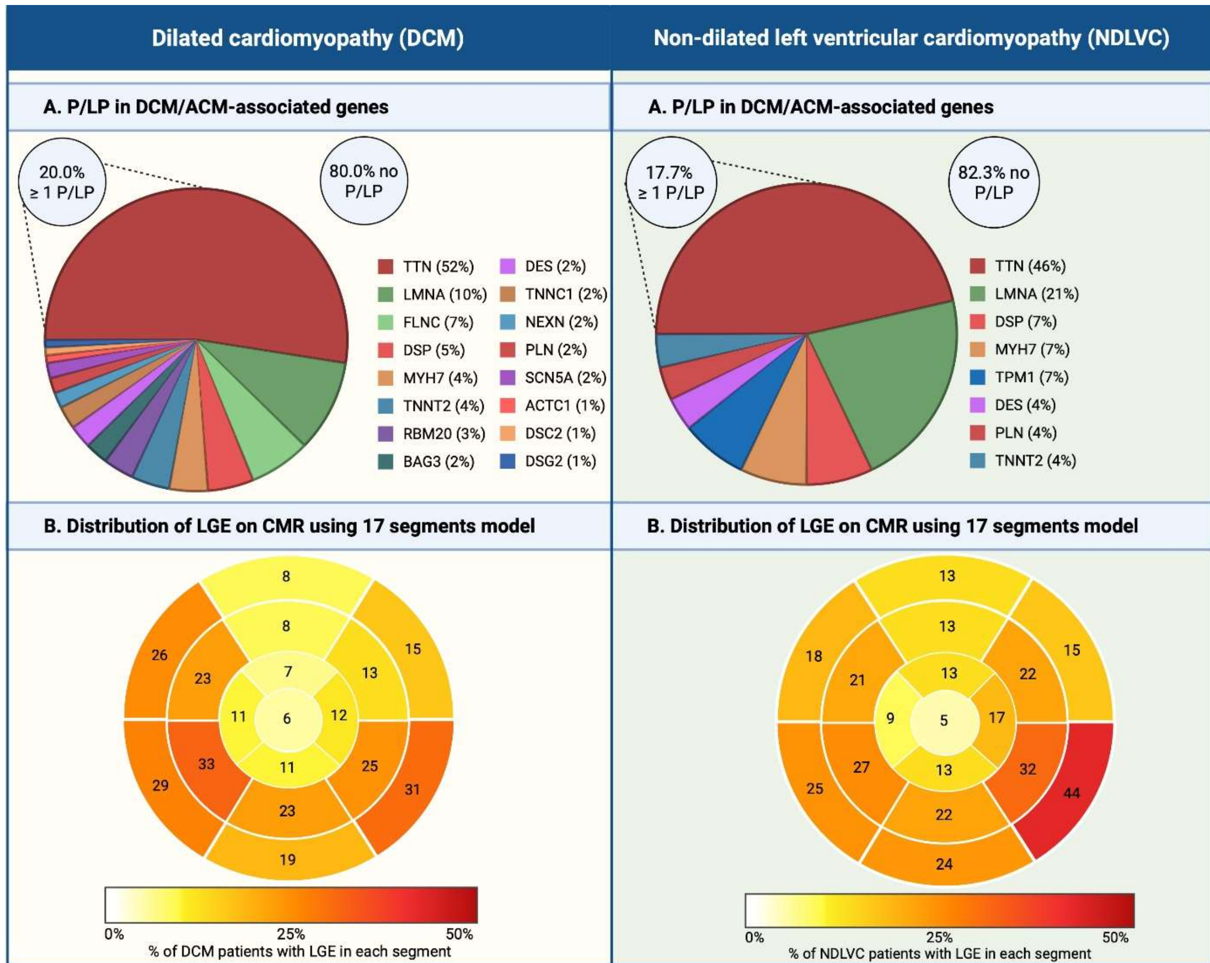
Methods:
Clinical data, cardiac magnetic resonance (CMR) with late gadolinium enhancement (LGE; 17-segment model), and pathogenic/likely pathogenic (P/LP) variants in DCM/arrhythmogenic cardiomyopathy-associated genes were collected. Phenotype-specific uni- and multivariable Cox models evaluated predictors of a composite VA/HF endpoint.

Results:
In 1130 patients (NDLVC n=318, DCM n=812), NDLVC patients were more often male (71.7 vs 58.7%, p<0.001), had higher left ventricular ejection fraction (LVEF 41.43 vs 32.03%, p<0.001) and more frequent LGE (37.4 vs 26.8%, p<0.001). Over a median follow-up of 6.2 years, composite event rates were similar (22.33 vs 23.40%, p=0.716). In multivariable analyses, LGE independently predicted outcomes in NDLVC (p=0.036), whereas male sex (p=0.040) and increasing left atrial volume index (p=0.044) were predictive in DCM. LVEF was not independently associated with outcomes. Septal LGE was more prevalent in DCM and associated with adverse outcomes (p=0.036). P/LP variant prevalence was comparable, with TTN variants most frequent (9.2 vs 10.3%). P/LP arrhythmogenic variants independently predicted outcomes in both phenotypes (p=0.012, p=0.040). Baseline PVC burden (p=0.024, p=0.005) and NSVT (p<0.001, p=0.003) were univariably associated with outcomes, without differential progression during follow-up.

Conclusion:
Despite more preserved ventricular structure and function at diagnosis, NDLVC patients experienced VA/HF event rates similar to DCM. Across phenotypes, arrhythmogenic genetic variants and myocardial fibrosis, rather than LVEF, were key determinants of outcome, supporting CMR- and genotype-guided risk stratification.

Keywords:
Dilated cardiomyopathy, Non-dilated left ventricular cardiomyopathy, Outcomes

Figure:
Figure 1. Comparison of genetic profile and LGE distribution in DCM versus NDLVC



Session 2: Imaging & diagnostics
Abstract 3

Impact of Aortic Valve Stenosis on the Photoplethysmography Signal Obtained at the Wrist: Towards Smartwatch-based Screening

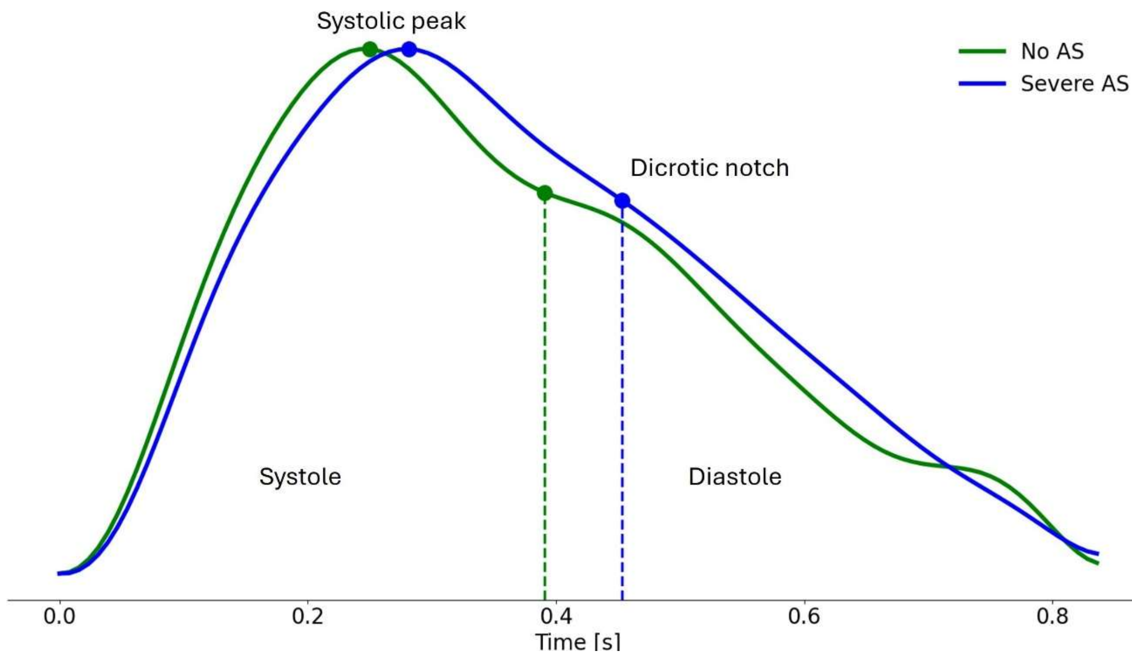
Presenting author: L.R. Pol
Department: Cardiology

L.R. Pol (Radboudumc, Nijmegen); *C.E. Jansen (Radboudumc, Nijmegen); N. van Royen (Radboudumc, Nijmegen); R. Edgar (Radboudumc, Nijmegen); J.L. Bonnes (Radboudumc, Nijmegen)*

Purpose:
Photoplethysmography (PPG) captures the blood volume curve under the skin, which may be altered in the presence of aortic valve stenosis (AS). If so, PPG could serve as a simple, low-cost method for remote screening of AS. We studied wrist-derived PPG features between patients with and without AS.
Methods:
PPG data (128Hz) were collected using a wristband (CardioWatch 278-2) during transcatheter aortic valve implantation and routine transthoracic echocardiography. Data were filtered (bandpass: 0.5-7Hz) and motion artefacts removed. PPG features were calculated using the systolic peak and dicrotic notch and the median of 300 heartbeats was taken. Comparisons were made between no/mild AS and moderate/severe AS, classified by echocardiography.
Results:
In total, 100 patients with and 100 patients without AS were included. Patients with AS were older (80 (IQR 75-84) vs 71 (IQR 63-77)), had a higher systolic blood pressure (149±23 vs 136±21) and lower diastolic blood pressure (70±14 vs 79±11) than patients without AS ($p<.001$). Heart rate did not differ ($p=.431$). The time until systolic peak (0.27±0.03 vs 0.25±0.04) and dicrotic notch (0.43±0.05 vs 0.41±0.04) were longer in patients with AS ($p<.001$). The relative systolic area under the curve (AUC) was increased in patients with AS (0.62±0.06 vs 0.59±0.06), while the relative diastolic AUC was decreased (0.34±0.07 vs 0.38±0.07) ($p<.001$).
Conclusion:
This explorative study demonstrates a difference in features of the PPG signal between patients without and patients with AS. If patients with AS can be distinguished using PPG, this might enable screening for AS using a PPG-sensor incorporated in a smartwatch.

Keywords:
Aortic valve stenosis, Photoplethysmography, Smartwatch

Figure:
Figure 1. Example of a PPG pulse corresponding to a heartbeat from a patient with severe AS (blue) and a patient without AS (green). The systole and the diastole are separated by the dotted lines. The systolic peak and dicrotic notch occur later in the patient with severe AS. The systolic AUC is larger in the patient with AS, while the diastolic AUC is smaller. Abbreviations: AUC = area under the curve, AS= aortic valve stenosis, PPG = photoplethysmography.



Session 2: Imaging & diagnostics
Abstract 4

Coronary CT Angiography Findings Drive Lipid-Lowering Therapy Initiation and Intensification in Clinical Practice

Presenting author: W.R. van de Vijver
Department: Cardiology

W.R. van de Vijver (Amsterdam UMC, Amsterdam); W.R. van de Vijver (Amsterdam UMC, Amsterdam & Cardiologie Centra Nederland, Utrecht); V.A. Verpalen (Amsterdam UMC, Amsterdam); J. Hennecken (Amsterdam UMC, Amsterdam); A.G. Somsen (Cardiologie Centra Nederland, Utrecht); I.I. Tulevski (Cardiologie Centra Nederland, Utrecht); R.A.P. Takx (Amsterdam UMC, Amsterdam); R.N. Planken (Mayo Clinic, Rochester); B.E.P.M. Claessen (Amsterdam UMC, Amsterdam); M.M. Winter (Amsterdam UMC, Amsterdam & Cardiologie Centra Nederland, Utrecht)

Purpose:
Lipid-lowering therapy (LLT) is the cornerstone of cardiovascular prevention. Current strategies in primary prevention rely on traditional risk factors, while actual CAD burden and severity is often unaccounted for. Coronary CT angiography (CCTA) provides direct assessment of CAD. We examined whether CCTA findings prompt initiation or intensification of LLT by the treating cardiologist.

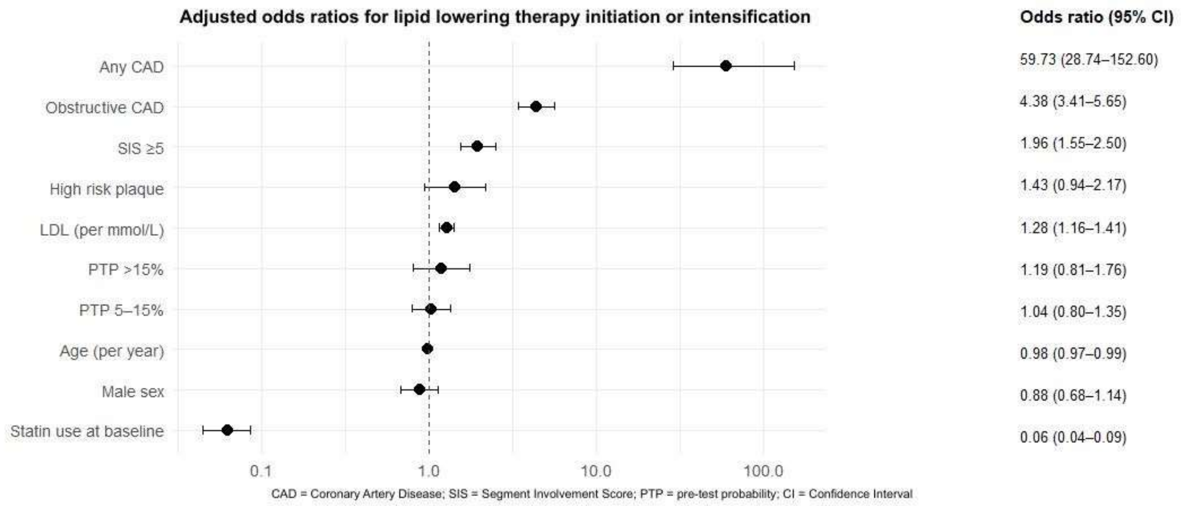
Methods:
We included 3,486 outpatients referred for CCTA due to anginal symptoms. LLT intensification was defined as initiation or up-titration of statins, addition of ezetimibe, or start of PCSK9 inhibitors within 90 days. Logistic regression evaluated whether CCTA findings were associated with LLT initiation or intensification. Imaging variables included any CAD, obstructive stenosis (≥50%), segment involvement score ≥5, and high-risk plaque. The model was adjusted for age, sex, pre-test probability, baseline statin use, and LDL cholesterol.

Results:
LLT was initiated or intensified in 714 patients (20.5%). Any CAD (OR ~60.0), obstructive stenosis (OR 4.4), and SIS ≥5 (OR 2.0) independently predicted initiation or intensification (all $p<0.001$). High-risk plaque showed a nonsignificant trend (OR 1.4).

Conclusion:
In patients undergoing CCTA, CAD burden and severity were independently associated with LLT initiation or intensification. These results show that CCTA findings directly guide lipid-lowering therapy beyond cardiovascular risk factors in clinical practice.

Keywords:
Coronary Artery Disease, Cardiovascular Risk Management, Coronary CT Angiography

Figure:



Session 2: Imaging & diagnostics
Abstract 5

Real-world Blood Pressure Outcomes of the HartWacht Telemonitoring Program for Hypertension Management

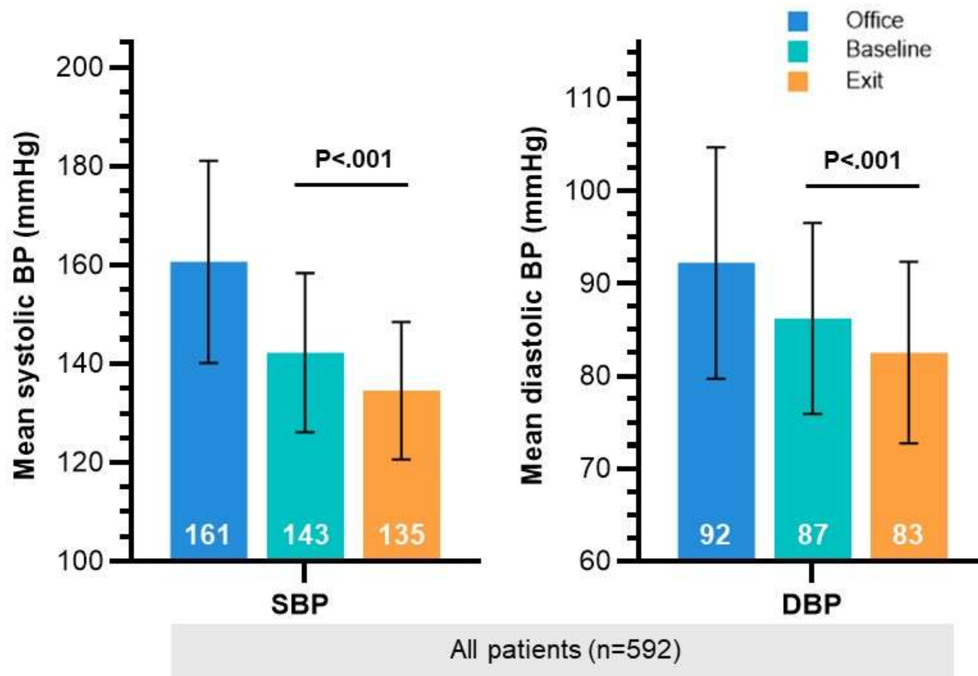
Presenting author: Y. Schut
Department: Cardiology

Y. Schut (Amsterdam UMC, Amsterdam); S. Blok (Amsterdam UMC, Amsterdam); N.J. van Steijn (Amsterdam UMC, Amsterdam); I.I. Tulevski (Cardiologie Centra Nederland, Amsterdam); F.M.A.C. Martens (Amsterdam UMC, Amsterdam); G.A. Somsen (Cardiologie Centra Nederland, Amsterdam), M.M. Winter (Amsterdam UMC, Amsterdam)

Purpose:
Telemonitoring has emerged as a scalable and effective strategy to improve hypertension management, but real-world data from integrated programs remain limited. We therefore aimed to evaluate blood pressure (BP) outcomes of the implemented, Dutch telemonitoring program HartWacht in routine cardiology practice and identify predictors of BP control.
Methods:
In this retrospective observational cohort study, hypertensive patients from outpatient cardiology clinics enrolled in the program between August 2016 and December 2024 were included. Patients performed structured home BP monitoring with protocol-based follow-up for lifestyle modification and medication uptitration when indicated. Primary outcomes were change in home BP and the proportion of patients achieving BP control, defined as a mean home BP <140/90 mmHg during the final month of participation. Multivariable logistic regression was used to identify predictors for BP control.
Results:
A total of 592 patients were included (mean age 61.8±11.3 years; 44% female), using a mean of 2.9±1.3 antihypertensive agents. Baseline office BP was 161/92 mmHg. Mean home BP was 143/87 mmHg during the first month, with 38% achieving BP control. At program exit, mean home BP decreased to 135/83 mmHg (−8/−4 mmHg; p<0.001), and 57% achieved BP control. Higher body mass index, type 2 diabetes, and elevated office systolic BP were independently associated with lower odds of achieving BP control.
Conclusion:
In clinical practice, structured hypertension telemonitoring was associated with clinically meaningful BP reductions and increased BP control rates. However, patients with obesity, diabetes, and higher baseline systolic BP remain at increased risk of uncontrolled hypertension, indicating the need for additional support and tailored management strategies within telemonitoring programs.

Keywords:
Hypertension, Telemonitoring,

Figure:
Blood pressure (BP) outcomes in the total cohort. Office BP was defined as the mean of the last office BP readings taken in an outpatient office visit. Baseline BP was the mean of BP readings taken over the first month period at home after enrollment. Exit BP was defined as the mean of BP readings taken in the last month of active participation. Error bars indicate standard deviations.



Session 2: Imaging & diagnostics
Abstract 6

The Impact of Lipoprotein(a) on Coronary Atherosclerotic Plaque Phenotype

Presenting author: V.A. Verpalen
Department: Cardiologie

V.A. Verpalen (Amsterdam UMC, Amsterdam); V.A. Verpalen (Amsterdam UMC, Amsterdam); C.F. Coerkamp (Amsterdam UMC, Amsterdam); S. Malkasian (UC San Diego Health, San Diego); E.L. Gaillard (Amsterdam UMC, Amsterdam); C.Y.Y. Beverloo (Amsterdam UMC, Amsterdam); S. Ibrahim (Amsterdam UMC, Amsterdam); W.R. van de Vijver (Amsterdam UMC, Amsterdam); B.E.P.M. Claessen (Amsterdam UMC, Amsterdam); P. Knaapen (Amsterdam UMC, Amsterdam); R.A.P. Takx (Amsterdam UMC, Amsterdam); R.N. Planken (Amsterdam UMC, Amsterdam); E.S.G. Stroes (Amsterdam UMC, Amsterdam); J.P.S. Henriques (Amsterdam UMC, Amsterdam); N.S. Nurmohamed (Amsterdam UMC, Amsterdam)

Purpose:
Lipoprotein(a) (Lp[a]) is a causal risk factor for cardiovascular events. However, the effect of Lp(a) on coronary plaque composition and high-risk plaque (HRP) features has not been fully characterized. This study aimed to investigate the association of Lp(a) with coronary atherosclerotic plaque phenotype at the plaque level.

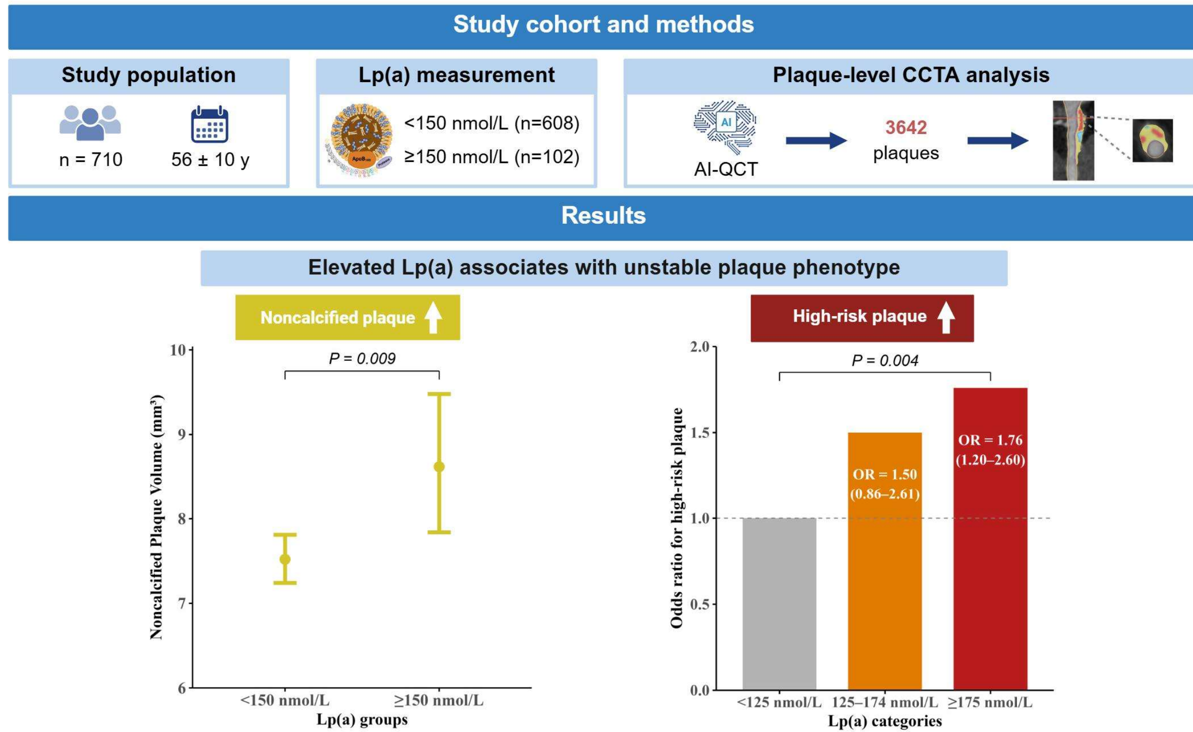
Methods:
This study included 710 patients who underwent coronary computed tomography angiography (CCTA) and had Lp(a) measured between 2008 and 2024. CCTA scans were analyzed with a previously validated artificial intelligence-based algorithm (AI-QCT, Cleerly Inc.). The association of Lp(a) with noncalcified and calcified plaque volumes and HRP features was evaluated at the plaque level using generalized estimating equation models adjusted for traditional cardiovascular risk factors.

Results:
The 710 patients had a mean age of 56±10 years, 379 (53%) were male and a total of 3642 plaques were identified. Patients with elevated Lp(a) levels (≥150 nmol/L) had a higher total plaque volume (71.6 mm3 vs 53.0 mm3; $P=0.003$). In the adjusted plaque-level analysis, elevated Lp(a) (≥150 nmol/L) was associated with an increase in noncalcified plaque volume per plaque ($P=0.009$), but not with an increase in calcified plaque volume ($P=0.81$). Furthermore, elevated Lp(a) (≥150 nmol/L) was strongly associated with the presence of HRP at the plaque level (adjusted odds ratio: 1.79, 95% CI: 1.25-2.55, $P=0.001$), whereas low-density lipoprotein cholesterol and high-sensitivity C-reactive protein were not ($P>0.05$).

Conclusion:
In this plaque-level CCTA study, elevated Lp(a) levels were independently associated with increased noncalcified plaque volume and with the presence of HRP, but not with calcified plaque volume. These findings elucidate the impact of Lp(a) on unstable plaque phenotypes in a primary prevention population.

Keywords:
Atherosclerotic cardiovascular disease, Coronary computed tomography angiography, Lipoprotein(a)

Figure:



Session 2: Imaging & diagnostics
Abstract 7

Polygenic Risk Score and Coronary Plaque Burden in Subclinical Atherosclerosis

Presenting author: E.L. Gaillard
Department: Cardiologie en Vasculaire Geneeskunde

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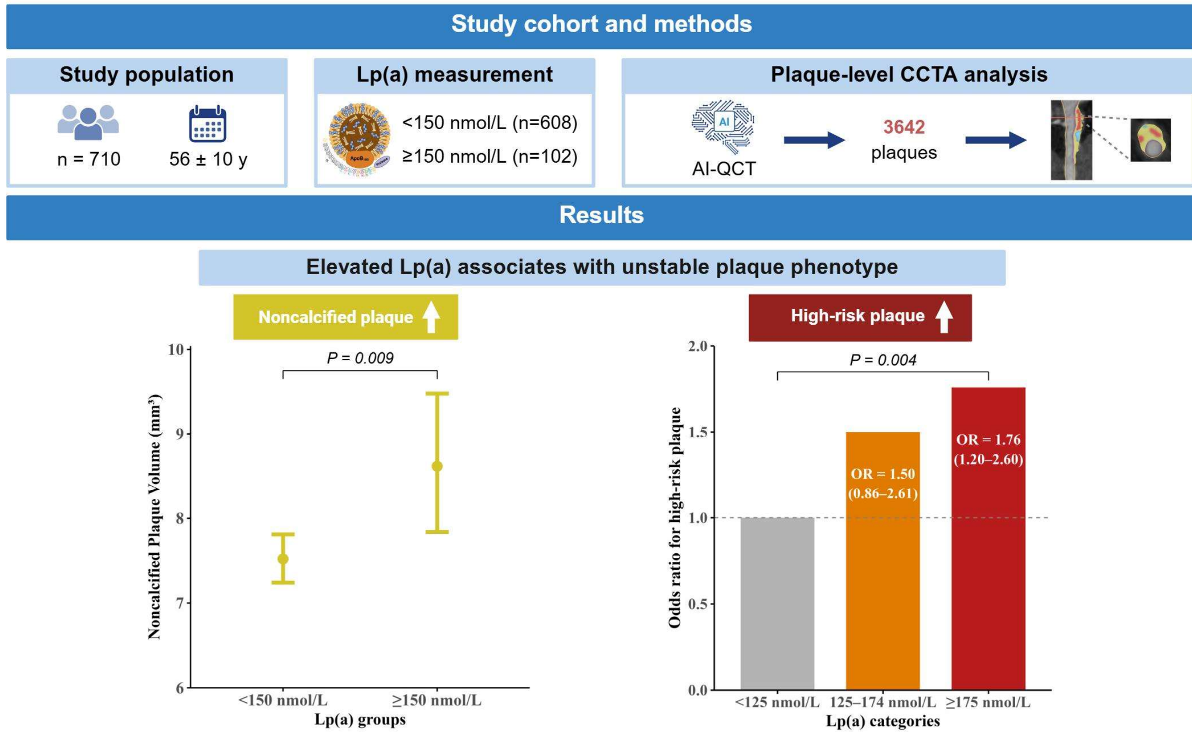
Purpose:
The association between coronary artery disease (CAD) polygenic risk score (PRS) and coronary plaque burden in patients with subclinical atherosclerosis is unclear. The goal of this study was to evaluate the relationship between CAD PRS and coronary plaque burden and high-risk plaque (HRP) features.
Methods:
Patients with subclinical atherosclerosis (CAD-RADS 1-2) on coronary computed tomography angiography (CCTA) underwent CAD PRS measurement. CCTA scans were analyzed with a previously validated artificial intelligence–based algorithm. The relationship between CAD PRS and percent atheroma volume (PAV) and HRP prevalence was assessed using linear and logistic regression models adjusted for age, sex, and conventional cardiovascular risk factors.
Results:
A total of 312 patients (mean age 62 ± 6 years; 57% male) were included. Patients with high CAD PRS had higher PAV than those with low CAD PRS (0.03% vs 0.02%; $P<0.001$)). Each standard deviation increase in CAD PRS was associated with a 0.008% higher PAV ($\beta=0.008$; 95% CI: 0.004-0.013; $P<0.001$) after multivariable adjustment. HRP prevalence increased across PRS groups: 46.8% (low), 50.3% (intermediate), and 67.2% (high). Patients with high CAD PRS had an OR of 3.16 (95% CI: 1.33-7.76; $P=0.010$) for having HRP compared with those with low CAD PRS.
Conclusion:
In patients with subclinical atherosclerosis, polygenic risk is independently associated with coronary plaque burden and high-risk plaque features.

Keywords:
Coronary artery disease, Polygenic risk score, Coronary computed tomography angiography

Figure:
Association of CAD polygenic risk score with high-risk plaque.



Session 3: Cardiac surgery & valvular heart disease
Abstract 1

Surgical Care for Rheumatic Heart Disease Patients: Insights from the Netherlands Heart Registration

Presenting author: L.L.G. de Wilde
Department: Cardiology

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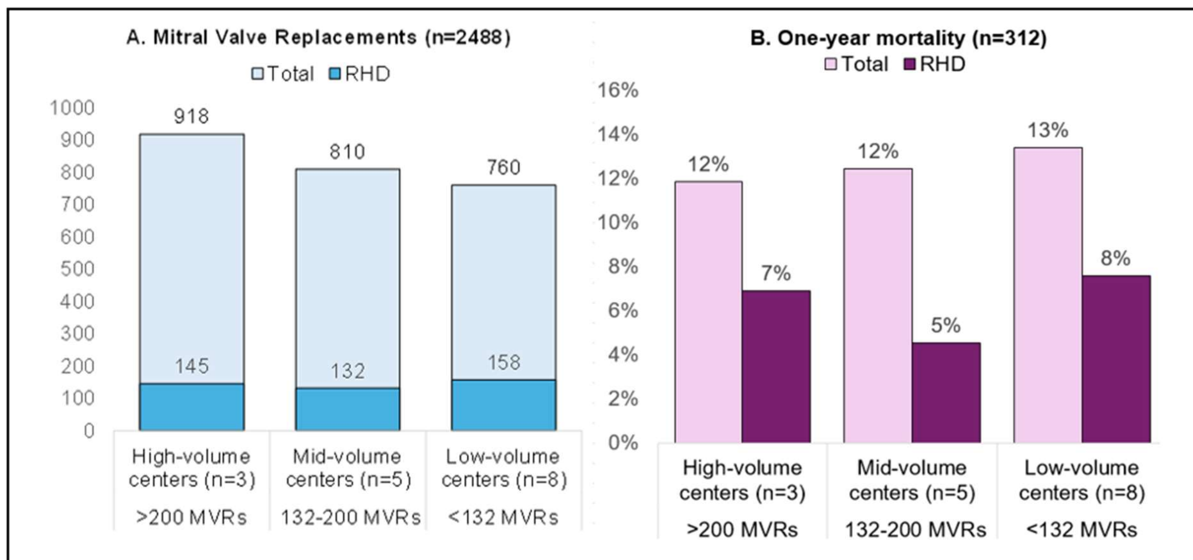
Purpose:
Although rheumatic heart disease (RHD) has declined in high-income countries, migration sustains its presence. Definite therapy for RHD is surgical mitral valve replacement (MVR), but data are lacking in the Netherlands. This study evaluated the overall surgical care for RHD patients with data from the Netherlands Heart Registration (NHR).
Methods:
This prospective cohort study included RHD MVR patients from all cardiothoracic centers (n=16) in the Netherlands. RHD MVR patients aged ≤ 75 years were identified in the NHR database between 2017 and 2023. Baseline, admission, procedural, and outcome data were analyzed, with up to five years of follow-up. RHD patients were compared across center volumes, divided into tertiles, and with non-RHD MVR patients in the NHR database.
Results:
In total, 435 RHD patients were included with a mean (SD) age of 58 (12) years and 73.3% was female. Upon admission, 77.0% of patients had a LVEF ≥ 50.0%, 40.2% had atrial fibrillation, 88.7% of patients were symptomatic, of which 45.3% were highly symptomatic (NYHA III-IV). Within a median (IQR) postoperative follow-up of 2.9 (1.1-4.6) years, total uncensored mortality was 12.2%. One-year mortality was similar among RHD MVR patients in high-volume (>200 MVRs) and low-volume (<132 MVRs) centers (p=0.791). One-year mortality did not differ between RHD and non-RHD MVR patients (HR: 0.80; 95% CI 0.53-1.21; p=0.288).
Conclusion:
These data show effective surgical care for RHD MVR patients, with similar one-year mortality rates across center volumes and compared with non-RHD MVR patients, suggesting that RHD MVR patients can be managed similarly as non-RHD MVR patients.

Keywords:
Rheumatic Heart Disease, Mitral Valve Replacement,

Figure:
Figure 1: Mitral Valve Replacements and One-year Mortality by Centre Volume (2017-2023). Mitral valve replacements (n=2488) and one-year mortality (n=312), stratified by centre volume according to the total number of patients treated between 2017 and 2023.
A. Mitral valve replacements in high-volume centres (n=3; >200 MVRs), mid-volume centres (n=5; 132-300 MVRs), and low-volume centres (n=8; <132 MVRs).
B. One-year mortality for MVR patients. There is no significant difference in RHD-related MVR mortality between high and mid-volume centres (p=0.402), mid and low-volume centres (p=0.272) and high- and low-volume centres (p=0.791).



Session 3: Cardiac surgery & valvular heart disease
Abstract 2

Revival of the Ross Procedure in Adults

Presenting author: N. Saouti
Department: cardio-thoracic surgery

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Purpose:
The aim of this study is to evaluate the short-term outcomes of our newly initiated Ross program in adults.
Methods:
All patients who underwent the Ross procedure at the Radboud University Medical Center between April 2024 and December 2025 were systemically followed up and data structurally collected. Baseline characteristics, operative details, and postoperative outcomes were extracted from the electronic medical record.
Results:
A total of 32 patients were included, median age of 42 years of which 63% were male and 93% had a bicuspid aortic valve. The predominant pathology was pure stenosis in 67%. All procedures were elective except one. There was no operative or 30-day mortality. Complications included one conversion to a Bentall procedure for leaflet retraction and one urgent percutaneous coronary intervention probably due to right coronary button kinking. No patient had more than mild aortic regurgitation at discharge.
Conclusion:
The Ross procedure in young and middle-aged adults was associated with favorable short-term outcomes in this initial cohort. These results support the feasibility and safety of the Ross procedure when performed in a dedicated expert center. Ongoing follow-up will be essential to assess medium- and long-term durability.

Keywords:
Ross procedure, adults, short-term outcomes

Session 3: Cardiac surgery & valvular heart disease
Abstract 3

When Waiting Is Not an Option: Urgent Versus Elective M-TEER in Real-World Practice

Presenting author: A.E. Geerlings
Department: Cardiology

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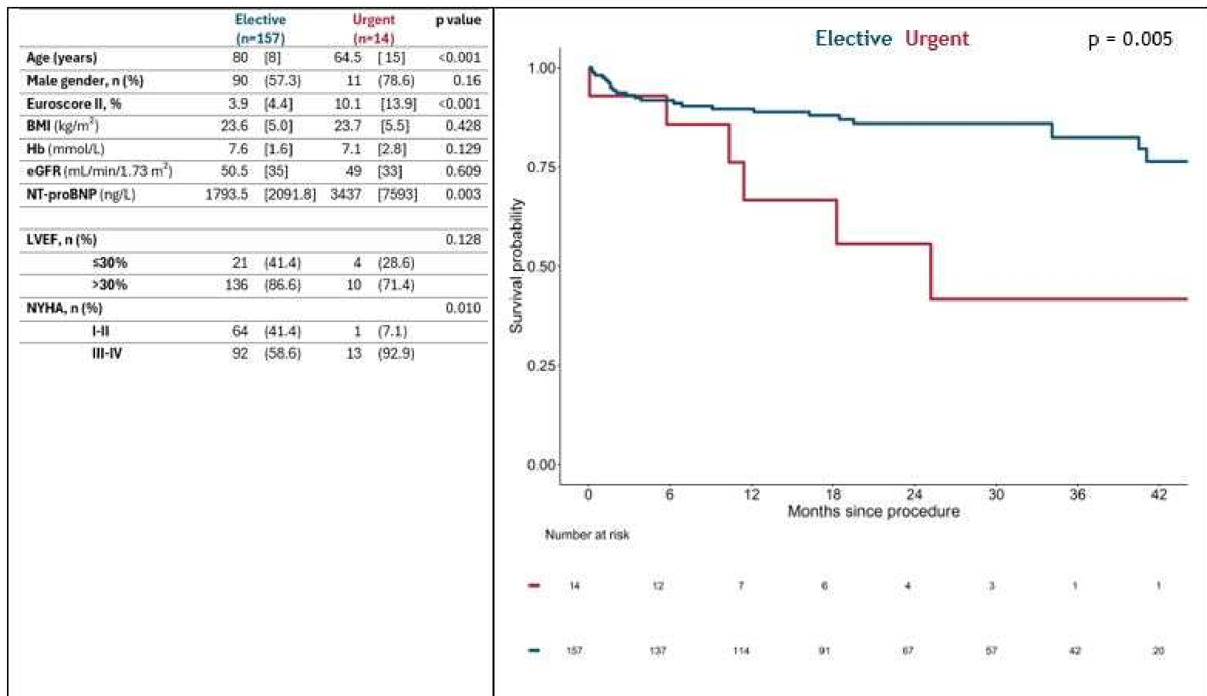
Purpose:
Transcatheter edge-to-edge repair (TEER) is an established treatment for severe mitral regurgitation (MR). However, most studies focus on elective cases, data on patients with urgent M-TEER are limited.
Methods:
We performed a retrospective cohort study including all M-TEER patients from January 2021 to December 2024. Urgent cases included patients diagnosed with severe MR, who were excluded from surgery due to co-morbidities, and required M-TEER intervention during their hospital stay. These patients could not be discharged without the procedure. Survival was analyzed using Kaplan–Meier and Cox regression.
Results:
Of 171 patients (median age 80 years, 59.1% male), of whom 157 underwent elective and 14 urgent M-TEER. Urgent M-teer patients were younger (64.5 vs 80 years, $p<0.001$), more often in NYHA class III–IV (92.9% vs 58.6%, $p=0.010$), had higher NT-proBNP levels (3437 vs 1793 ng/L, $p=0.003$) and had a higher EuroSCORE II (10.1 vs 3.9 $p<0.001$).There were no patients with mechanical circulatory support. Mortality was 7% (n=1) among urgent cases vs 1,9% (n=3) after 30 days, and 28.6% vs 10.2% ($p = 0.063$) after 1 year follow-up. During a median follow up of 24 months, urgent M-TEER was associated with higher all-cause mortality compared with elective M-TEER when adjusted for age and sex (HR 3.5, 95%CI 1.4–9.3,$p=0.01$).
Conclusion:
M-TEER performed an urgent setting in patients with advanced heart failure is associated with worse survival compared to those who underwent an elective procedure. Nevertheless, urgent M-TEER represents a feasible therapeutic option for selected patients with severe MR who cannot be discharged without intervention.

Keywords:
Urgent, M-TEER, Mitral regurgitation

Figure:
Table 1 Continuous variables are presented as median [interquartile range] due to non-normal distribution. Categorical variables are presented as number (%).
Figure 1 Kaplan–Meier survival curves for elective versus urgent M-TEER. Patients were censored at the date of last follow-up (17-05-2025).



	Elective (n=157)		Urgent (n=14)		p value
Age (years)	80	[8]	64.5	[15]	<0.001
Male gender, n (%)	90	(57.3)	11	(78.6)	0.16
Euroscore II, %	3.9	[4.4]	10.1	[13.9]	<0.001
BMI (kg/m^2)	23.6	[5.0]	23.7	[5.5]	0.428
Hb (mmol/L)	7.6	[1.6]	7.1	[2.8]	0.129
eGFR (mL/min/1.73 m^2)	50.5	[35]	49	[33]	0.609
NT-proBNP (ng/L)	1793.5	[2091.8]	3437	[7593]	0.003
LVEF, n (%)					0.128
≤30%	21	(41.4)	4	(28.6)	
>30%	136	(86.6)	10	(71.4)	
NYHA, n (%)					0.010
I-II	64	(41.4)	1	(7.1)	
III-IV	92	(58.6)	13	(92.9)	

Session 3: Cardiac surgery & valvular heart disease
Abstract 4

Outcomes After Transcatheter Edge-to-Edge Repair for Secondary Mitral Regurgitation Beyond Left Ventricular Ejection Fraction

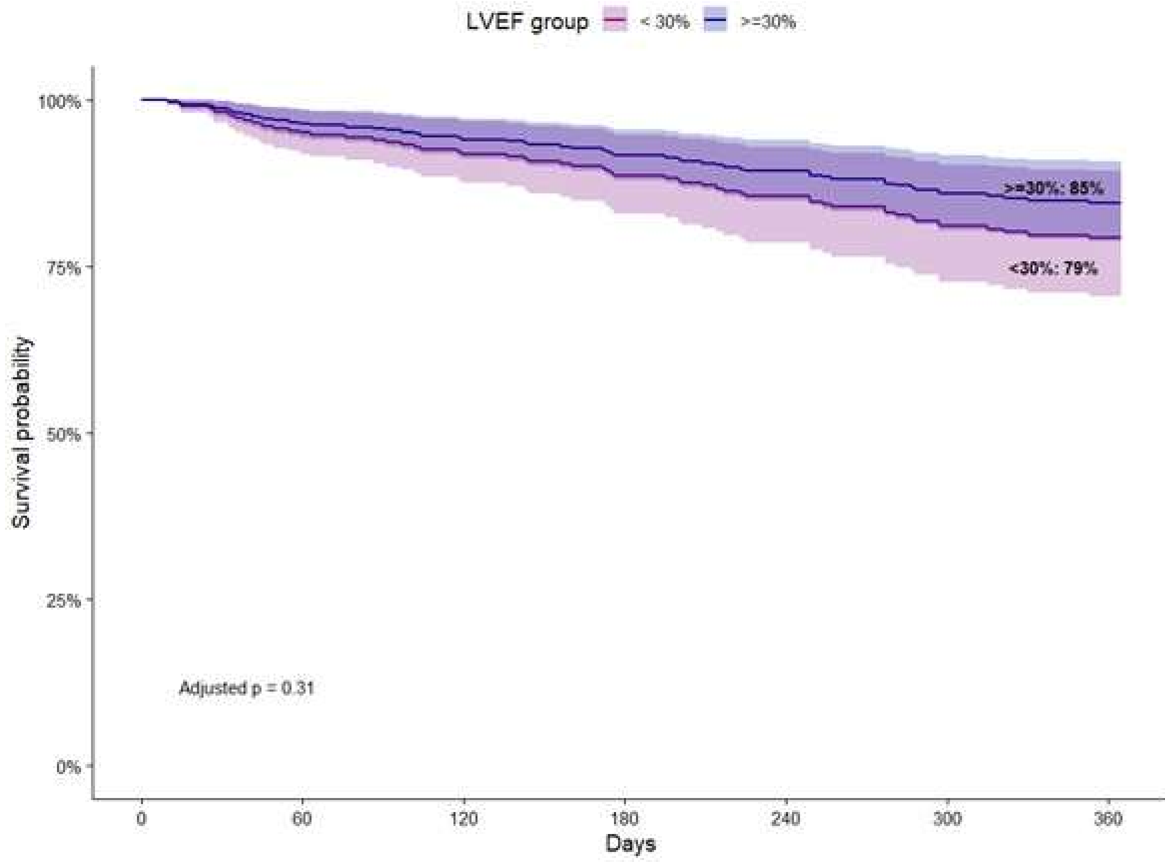
Presenting author: M.J.M. Welman
Department: Cardiologie

M.J.M. Welman (Maastricht University Medical Center+, Maastricht); B.B.E. van de Wouw (Netherlands Heart Registration, Utrecht); L. Timmers (St. Antonius Hospital Nieuwegein); A. van 't Hof (Maastricht University Medical Center+, Maastricht; P.A. Vriesendorp (Maastricht University Medical Center+, Maastricht) On behalf of the Transcatheter Heart Valve Interventions Registration Committee of the Netherlands Heart Registration

Purpose:
Secondary mitral regurgitation (SMR) is associated with adverse outcomes in patients with systolic heart failure. Although current guidelines have clarified the role of transcatheter edge-to-edge repair (TEER), real-world outcome data across different levels of left ventricular ejection fraction (LVEF) remain limited.
Methods:
This nationwide observational cohort included patients undergoing TEER for SMR between 2021 and 2024, using data from the Netherlands Heart Registration and the Dutch Hospital Data. Patients were stratified according to baseline LVEF (<30% vs. ≥30%). The primary endpoint was one-year survival; secondary endpoint included heart failure hospitalization. Multivariable analyses were performed to identify factors associated with outcomes.
Results:
Among 378 patients, 91 (24%) had a baseline LVEF <30% and were characterized by higher EuroSCORE II, younger age, and male predominance. Adjusted one-year survival did not differ between LVEF <30% and ≥30% (79% vs 85%, p = 0.31). EuroSCORE II (HR 1.04, 95% CI 1.00–1.07; p = 0.02), and impaired mobility (HR 4.50, 95% CI 2.03–9.97; p < 0.001) were independent predictors of survival, while the baseline LVEF group was not. Heart failure hospitalization rates were comparable between LVEF groups (log-rank p = 0.29). Baseline LVEF group was not independently associated with heart failure hospitalization (OR 0.79, 95% CI 0.48–1.28; p = 0.33), whereas urgent TEER was associated with an increased risk (OR 2.10, 95% CI 1.12–3.92; p = 0.02).
Conclusion:
In real-world practice, one-year survival after TEER for SMR was not independently associated with baseline LVEF, with outcomes primarily driven by preoperative risk and clinical vulnerability.

Keywords:
Secondary Mitral Regurgitation, Transcatheter Edge-to-Edge Repair, Clinical Outcomes

Figure:



Session 3: Cardiac surgery & valvular heart disease
Abstract 5

Serum Proteomic Assessment and Deep Immunophenotyping in Aortic Stenosis

Presenting author: E.P.M. van Doorn
Department: Cardiology

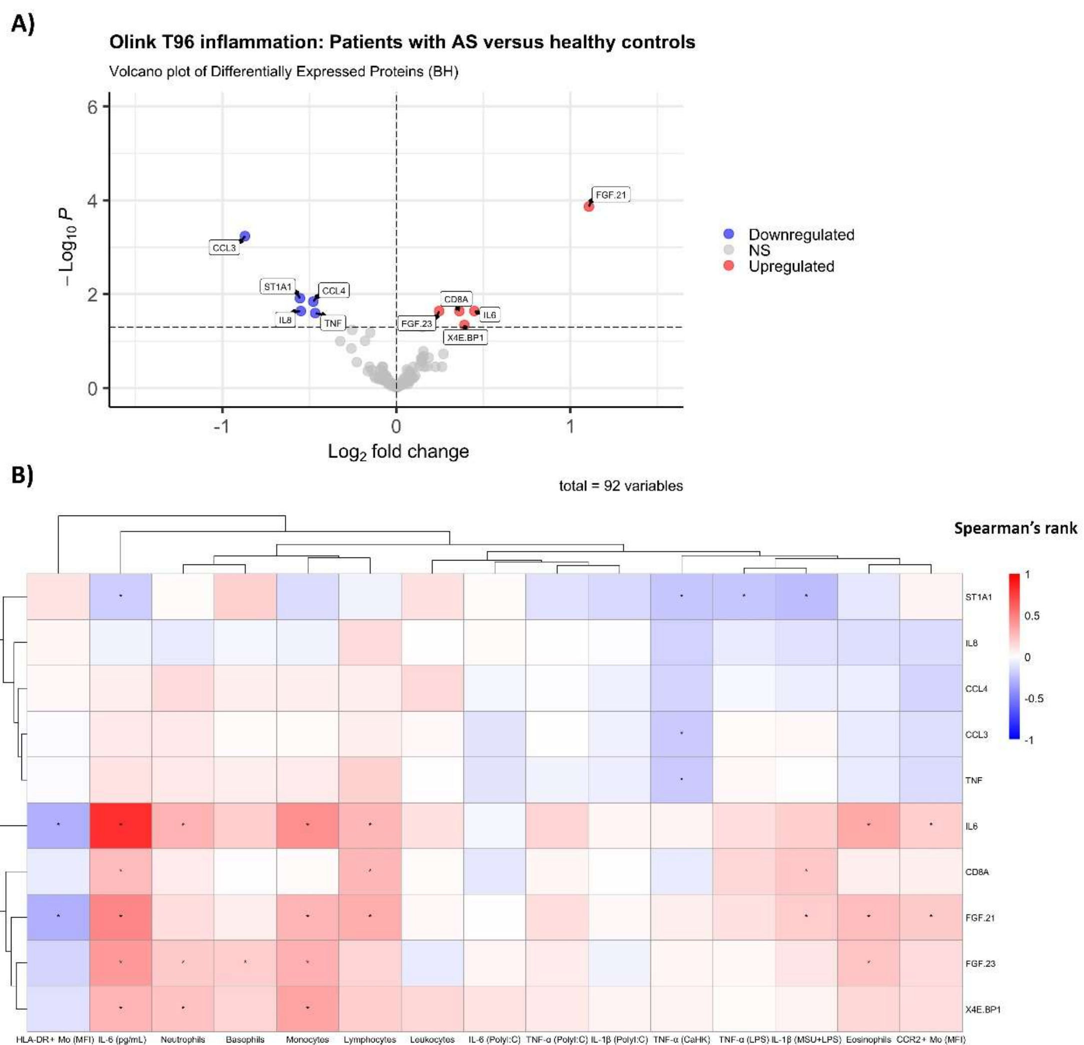
E.P.M. van Doorn (Radboudumc, Nijmegen); W. Broeders (Radboud University Medical center, Nijmegen); A. van Broekhoven (Radboud University Medical Center, Nijmegen); A. Cetinyurek-Yavuz (Radboud University Medical Center, Nijmegen); M.G. Netea (Radboud University Medical Center, Nijmegen); N. van Royen (Radboud University Medical Center, Nijmegen); N.P. Riksen (Radboud University Medical Center, Nijmegen); S. El Messaoudi (Radboud University Medical Center, Nijmegen)

Purpose:
Aortic stenosis (AS) involves progressive fibrocalcific remodeling of the aortic valve, eventually causing left ventricular outflow obstruction. No pharmacological therapies currently slow AS progression, highlighting the need for early biomarkers. Increasing evidence points to innate immune activation in the development and progression of AS, yet the specific inflammatory mediators involved are not fully defined. This study aimed to identify inflammation-related circulating proteins that differentiate patients with AS from healthy controls and to assess their associations with markers of systemic inflammation.
Methods:
Serum samples from 118 patients with tricuspid AS and 65 healthy controls were analyzed using the Olink Target 96 Inflammation panel, quantifying 92 inflammation-related proteins via proximity extension assay. Leukocyte composition, circulating inflammatory markers, monocyte phenotype, and peripheral blood mononuclear cell (PBMC) cytokine production capacity were also evaluated. Multiple testing was corrected using the Benjamini–Hochberg FDR method.
Results:
Seventeen of 92 proteins differed significantly between AS patients and controls, including nine downregulated and eight upregulated proteins. Among the upregulated proteins, FGF-21, FGF-23, IL-6, CD8A, and 4E-BP1 showed the most consistent differences, remaining significant after adjusting for age and sex (Figure 1A). These proteins positively correlated with leukocyte composition, monocyte CCR2 expression, and PBMC capacity to produce TNF-α and IL-1β. HLA-DR expression showed inverse correlations with proteins elevated in AS (Figure 1B).
Conclusion:
Patients with tricuspid AS displayed higher circulating levels of FGF-21, FGF-23, IL-6, CD8A, and 4E-BP1. These were linked to leukocyte composition, markers of monocyte activation, and higher PBMC cytokine production capacity, indicating a more pro-inflammatory monocyte profile in AS.

Keywords:
Aortic stenosis, Inflammation, Proteomics

Figure:

Figure 1. Proteomic signatures in patients with AS versus healthy controls.
A) Volcano plot showing the differentially expressed proteins in patients with AS versus healthy controls after adjustment for age and sex. B) Heatmap showing spearman correlations between significantly expressed proteins and the circulating inflammatory profile and function in patients with AS and healthy controls. CaHK = Heat-killed Candida albicans; CCL = C-C motif chemokine ligand; CCR2 = C-C chemokine receptor type 2; CD8A = Cluster of Differentiation 8 alpha chain; FGF = Fibroblast Growth Factor; HLA-DR = Human Leukocyte Antigen-DR isotype; IL = Interleukin; LPS = Lipopolysaccharide; MFI = Median Fluorescence Intensity; Mo = Monocyte; MSU = Monosodium urate crystals; PolyI:C = Polyinosinic:polycytidylic acid; ST1A1 = Sulfotransferase family 1A member 1; TNF = Tumor Necrosis Factor; X4E-BP1 = Eukaryotic translation initiation factor 4E-binding protein 1.



Session 3: Cardiac surgery & valvular heart disease
Abstract 6

Patient-reported Quality Of Recovery after Minimally Invasive Valve Surgery: a Prospective Observational Study

Presenting author: S. van Straten
Department: Cardiothoracic Surgery

S. van Straten (Isala, Zwolle); *S. van Straten (Isala, Zwolle); J.R. Olsthoorn (Isala, Zwolle)*

Purpose:
Minimally invasive valve surgery aims to reduce surgical trauma and accelerate postoperative recovery. The transaxillary approach may positively influence functional recovery. However, patient-reported recovery after transaxillary valve surgery remains insufficiently described. This study evaluated patient-reported quality of recovery (QoR) after transaxillary valve surgery.

Methods:
All patients undergoing transaxillary valve surgery with complete longitudinal QoR-15 data were included. Assessments were performed preoperatively, on postoperative day 2 (POD2), at discharge and six weeks after surgery. QoR-15 scores were reported as median and interquartile range (IQR) and compared over time using the Friedman test. Postoperative pain was assessed using the Numeric Rating Scale during hospitalization.

Results:
In total, 60 patients were included. Median age was 70.5 years [60.3-74.0] and 66.7% was male. Transaxillairy procedures included AVR n=42, MVP n=14, combined MVP and TVP n=2 and myxoma resection n=2. Median length of hospital stay was 5 days [4-6]. Postoperative complications observed during hospitalization included the following: Postoperative AF occurred in 18 patients (30.0%), permanent pacemaker implantation in 3 patients (5.0%), ICU readmission in 1 patient (1.7%), and pleural drainage was required in 2 patients (3.3%). Median QoR-15 score was 136.5 [123.5-143.8] preoperatively. Scores declined on POD2 to 127 [107-134], followed by rapid recovery, returning to baseline at discharge 135 [123.3-140.8]. At six weeks, QoR-15 scores increased further to 145.0 [141.0-148.0], exceeding preoperative values (overall $p < 0.001$), indicating not only recovery but functional improvement beyond baseline. Median postoperative pain scores, assessed using the Numeric Rating Scale (NRS), were low and decreased over time: after detubation the median score was 2 [1-3], on postoperative day 1 it remained 2 [1-3], on postoperative day 2 it decreased to 1 [1-2] and at hospital discharge the median score was 1 [1-1.75].

Conclusion:
Transaxillary heart valve surgery is associated with a rapid and favorable patient-reported recovery. Low postoperative pain scores support the transaxillary approach as a patient-centered and recovery-focused surgical strategy. Longitudinal assessment using the QoR-15 provides clinically meaningful insight into recovery after minimally invasive heart valve surgery.

Keywords:
Minimally Invasive Valve Surgery, Transaxillary valve surgery, Patient reported outcomes

Session 3: Cardiac surgery & valvular heart disease
Abstract 7

Minimally Invasive Versus Sternotomy Mitral Valve Surgery in Patients Aged 70 Years and Older: a Nationwide Study

Presenting author: E. Farag
Department: Cardiothoracic Surgery

J.R. Olsthoorn (Isala, Zwolle); *J.R. Olsthoorn; A. Tjon Joek Tjien; K. Ko; S. Heuts; S. Houterman; M. Roefs; S. Singh; N. Verberkmoes*

Purpose:
Older patients are more prone to postoperative morbidity and mortality after mitral valve (MV) surgery. Minimally invasive MV surgery (MIMVS) is increasingly adopted worldwide, with a potential benefit in the elderly. This study compares short- and mid-term outcomes in patients over 70 years old, undergoing MIMVS versus median sternotomy (MST), in a nationwide registry.
Methods:
All patients over 70 years old undergoing primary elective MV surgery (± tricuspid valve (TV) surgery, atrial septal defect closure, rhythm surgery) between 2013-2021 were included. All data were extracted from the Netherlands Heart Registration. Primary outcomes were short-term morbidity, mortality and 5-year survival.
Results:
In total, 1418 patients were included (MST n=797, MIMVS n=621). No statistically significant differences in baseline characteristics were found. Median Logistic EuroSCORE I was 6.3 [4.7-8.5] vs. 6.0 [4.6-8.5], p=0.27) for MST and MIMVS, respectively. MV repair rate (77.7% vs 64.7% p<0.001) and concomitant TV surgery (43.9% vs 18.2%, p<0.001) was more frequently performed in MST. Lower 30-day mortality was observed in MIMVS (0.6% (n=4) vs 2.5% (n=21), p=0.01). Furthermore, the incidence of pneumonia, prolonged intubation, re-admission to ICU, kidney failure and new-onset arrhythmia were lower for MIMVS. No difference in 5-year survival was found (MST: 89.1±4.6% vs MIMVS: 91.6±4.7% Log-Rank p=0.51).
Conclusion:
MIMVS in patients over 70 years old may be associated with lower 30-day mortality and incidence of postoperative complications compared to sternotomy.

Keywords:
Mitral Valve Surgery, Minimally Invasive Surgery, Netherlands Heart Registration

Session 3: Cardiac surgery & valvular heart disease
Abstract 8

Upper-hemi Sternotomy Aortic Arch Surgery without Circulatory Arrest: a Feasibility Study of Zone 1-2 Repair

Presenting author: J.R. Olsthoorn
Department: Cardiothoracic Surgery

J.R. Olsthoorn (Isala, Zwolle); *J.R. Olsthoorn; M. Pieraets; E. Farag; K. Lam*

Purpose:
Aortic arch surgery (zone 1-2) is traditionally performed through sternotomy and frequently requires hypothermic circulatory arrest to facilitate distal anastomosis and cerebral protection. While effective, circulatory arrest is associated with neurological and systemic risks. Minimally invasive approaches for arch pathology remain scarcely reported, largely due to concerns regarding exposure, cannulation strategies and cerebral protection. This study evaluates the technical feasibility and early clinical outcomes of performing aortic arch surgery through an upper-hemi sternotomy without circulatory arrest.
Methods:
All consecutive patients undergoing aortic arch surgery (zone 1-2) through upper-hemi sternotomy were retrospectively analyzed. Femoral arterial cannulation was used in all patients. Cerebral protection was achieved by direct brachiocephalic trunk cannulation for 1/3 arch (zone 1) procedures and by additional direct left carotid artery cannulation for zone 2 procedures, using a 13-Fr cannula. Clamping was achieved in either zone 1 or 2.
Results:
ix patients were included. Median age was 64 years [IQR 55.5-67.3], median BMI was 27.1 kg/m² [IQR 24.8-29.8] and five patients were male. Median EuroSCORE II was 5.1% [IQR 2.9-5.8]. Procedures performed included supracoronary ascending aortic replacement (SCAR) with 1/3 arch extension (n=4), Bentall with 1/3 arch replacement (n=1) and AVR with SCAR and 2/3 arch extension (n=1). Surgical access was obtained at the third intercostal space (n=5) or fourth intercostal space (n=1). No conversion to full sternotomy and need for circulatory arrest was required. Median CPB and cross-clamp time were 243 [IQR 164-266] and 121 [IQR 74-135] respectively. There was no operative or 30-day mortality and no postoperative stroke or neurological deficit. Median chest drain output was 203 ml [IQR 120-240]. Postoperative AF occurred in two patients and one patient required pericardial drainage. Median intensive care and hospital stay were 1 day [IQR 1-1] and 6 days [IQR 4-8] respectively.
Conclusion:
This study demonstrates that aortic arch procedures can be safely and reproducibly performed through an upper-hemi sternotomy without circulatory arrest. Although limited by small patient numbers, these findings suggest that a minimally invasive, no-circulatory arrest strategy may represent a viable alternative in carefully selected patients.

Keywords:
Aortic Surgery, Minimally Invasive Surgery, Novel technique

Session 4: Coronary heart disease & prevention
Abstract 1

Development of a Resilience Assessment Tool for Cardiac Care Pathways in Europe: a Mixed-methods Study

Presenting author: N.S. Klazinga
Department: Poblic and Occupational Health

A.S.V. Carvalho (Amsterdam UMC, Amsterdam); A.S.V. Carvalho (Amsterdan UMC, Amsterdam); Ó.B. Fernandes (Amsterdam UMC, Amsterdam); J. Piek (Amsterdam UMC, Amsterdam); W. Wijns (The Lambe Institute for Translational Medicine and CURAM, University of Galway, Galway, Ireland); Niek Klazinga (Amsterdam UMC, Amsterdam) Dionne Kringos (Amsterdam UMC, Amsterdam)

Purpose:
Background: The COVID-19 pandemic exposed critical vulnerabilities in cardiac care delivery, highlighting the need for greater resilience in care pathways. Given the gap in practical tools tailored to cardiac care, this study describes the development of a resilience assessment tool for European cardiac care pathways.
Methods:
Methods: Explanatory sequential mixed-methods study: 1) a survey to cardiologists from EU Member States to map disruptions and innovations during the pandemic; 2) five multi stakeholder focus groups with representatives from various EU countries; quantitative data was analysed using descriptive statistics and qualitative data using thematic analysis; 3) the resilience assessment tool was developed through a collaborative multi-stakeholder approach.
Results:
Results: A total of 177 professionals replied to the survey and 40 informants participated in the focus groups. Staff shortages and infrastructure capacity were perceived as the most relevant challenges during the pandemic. The measures most frequently reported to address staff shortages and infrastructure capacity shortages were the reallocation of health staff (75%;n=133) and repurposing infrastructures (38%;n=32), respectively. Seventeen resilience sub-dimensions and related actions were identified. The resulting tool includes four components: (1) mapping of the local cardiac care pathway, (2) stakeholder identification for ABSTRACT | RESIL-Card is a EU-funded project (EU4Health#101129203) collective self-assessment, (3) a preparedness checklist generating a visual heat map, and (4) a resource toolkit with recommended actions and good practices
Conclusion:
Conclusion: The resilience assessment tool offers step-by-step guidance to strengthening cardiac care pathways across six key resilience dimensions, supported by actionable recommendations. By enabling users to identify context-specific vulnerabilities and improvement priorities, the tool supports healthcare professionals and policy-makers in advancing preparedness and cardiac care continuity before, during, and after crises. Its implementation is being piloted in European hospitals to assess usability and refine its practical value

Keywords:
resilience assessment tool, cardiac pathways

Session 4: Coronary heart disease & prevention
Abstract 2

Ticagrelor-Based Dual Antithrombotic Therapy in Anticoagulated Patients Undergoing PCI: A Pooled Analysis of Two Multicenter Registries

Presenting author: Q.Y.F. van de Pol
Department: Cardiology

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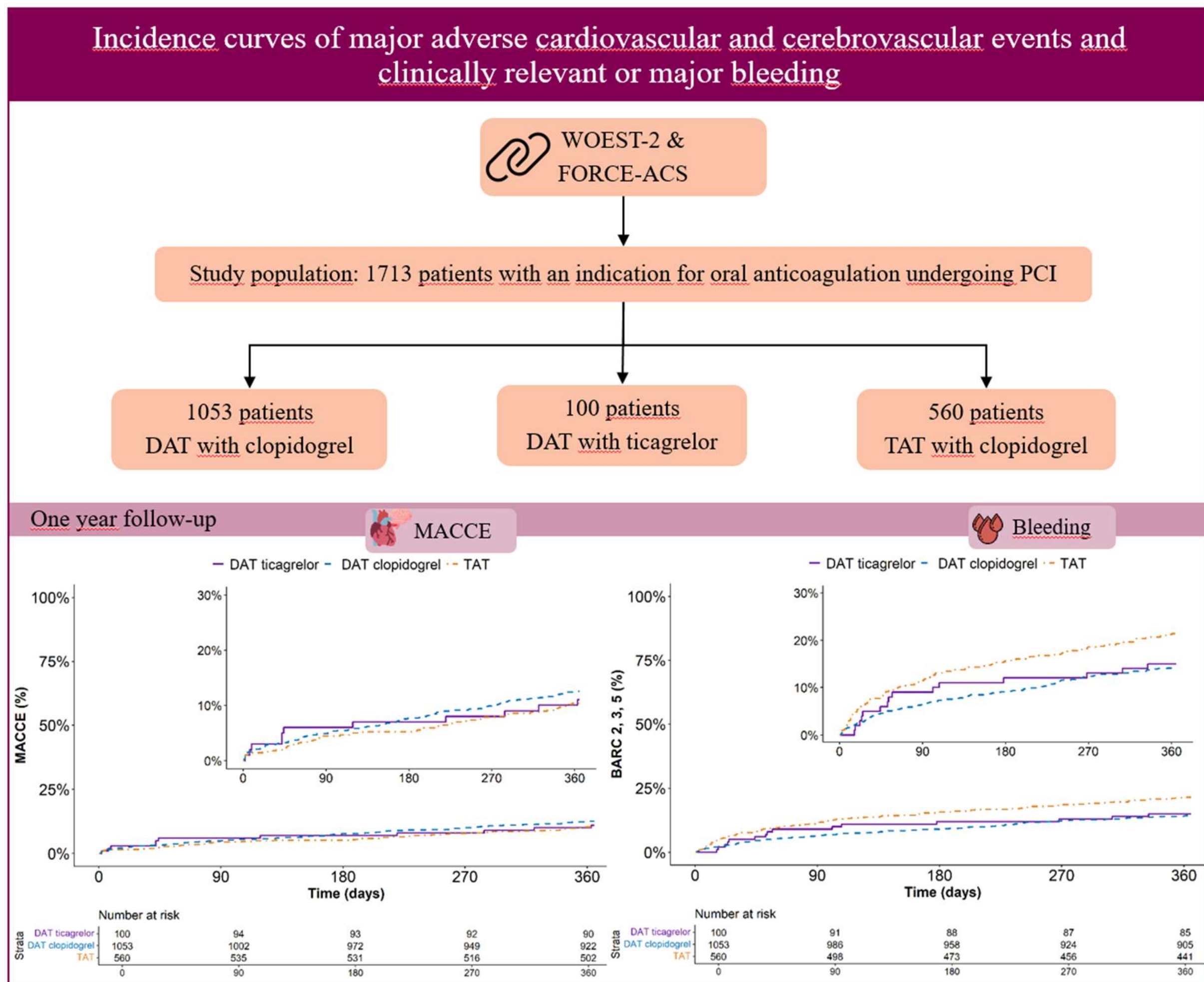
Purpose:
Dual antithrombotic therapy (DAT) after short-term triple antithrombotic therapy (TAT) is recommended in patients requiring chronic oral anticoagulation after percutaneous coronary intervention (PCI). Clopidogrel is the preferred $P2Y_{12}$ inhibitor to reduce bleeding risk, but its pharmacodynamic limitations raise concerns about ischemic protection. This analysis explored the clinical consequences of intensifying platelet inhibition with ticagrelor as part of DAT in anticoagulated patients undergoing PCI.
Methods:
Data were pooled from two prospective multicenter registries including anticoagulated patients undergoing PCI. Patients were classified by discharge medication: ticagrelor-based DAT, clopidogrel-based DAT, or clopidogrel-based TAT. The co-primary endpoints were a composite of all-cause mortality, myocardial infarction, definite stent thrombosis (ST), ischemic stroke or transient ischemic attack (MACCE) and clinically relevant or major bleeding (BARC 2, 3 or 5) at one year. Propensity score matching was used to adjust for baseline differences.
Results:
Among 1713 patients, 5.8% received ticagrelor-based DAT, 61.5% clopidogrel-based DAT, and 32.7% TAT. Ticagrelor-based DAT had similar MACCE rates (11% vs 12.5%), though higher observed rates of definite ST compared to clopidogrel-based DAT which remained significant after matching (4.6% vs 0.4%, p=0.028). MACCE rates were similar in ticagrelor-based DAT and TAT (11.0% vs 10.4%) which sustained after matching. Bleeding rates did not differ significantly between the two DAT strategies (15% vs 14.3%), but bleeding occurred less frequently with ticagrelor-based DAT than with clopidogrel-based TAT (15% vs 21.4%).
Conclusion:
Intensification of platelet inhibition with ticagrelor was not associated with improved ischemic outcomes while bleeding rates were comparable to clopidogrel-based DAT and lower than with TAT.

Keywords:
Percutaneous Coronary Intervention, Oral Anticoagulation, P2Y12 inhibitor

Figure:
Figure 1. Central Illustration: Clinical outcomes of DAT with ticagrelor compared to DAT with clopidogrel and clopidogrel-based TAT. This analyses was performed using pooled data from two prospective multicenter registries including anticoagulated patients undergoing PCI. The What is the Optimal antiplatElet and anticoagulant therapy in patients with oral anticoagulation undergoing revasculariSation 2 (WOEST-2) registry and The Future Optimal Research and Care Evaluation: On the Way to 'Personalized Medicine' with an Ongoing Registry of Patients with Acute Coronary Syndrome in Daily Clinical Practice (FORCE-ACS) registry. Patients were classified by discharge medication. The co-primary endpoints were a composite of all-cause mortality, myocardial infarction, definite stent thrombosis, ischemic stroke or transient ischemic attack (MACCE) and clinically relevant or major bleeding (BARC 2, 3 or 5) at one year follow-up.



Session 4: Coronary heart disease & prevention
Abstract 3

Infarct-related Myocardial Resistance Before Reperfusion in Patients With Acute Myocardial Infarction to Predict Microvascular Injury and Clinical Outcomes

Presenting author: K.A.J. van Beek
Department: Cardiologie

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Purpose:
Microvascular injury (MVI) increases the risk of heart failure and mortality in patients with ST-elevation myocardial infarction (STEMI). Therefore, it is important to detect these patients at an early stage for additional (experimental) therapies to improve outcomes. Currently, there are no methods to diagnose MVI in STEMI patients before reperfusion. The objective of this study was to assess the invasively measured infarct-related absolute myocardial resistance (Rinfarction) to predict MVI before reperfusion. Cardiac magnetic resonance imaging (CMR) characterises MVI, in the forms of microvascular obstruction (MVO) and intramyocardial hemorrhage (IMH) with IMH being at the 'extreme' end of the injury spectrum.
Methods:
In this substudy of the EURO-ICE trial, Rinfarction was calculated as the change in distal coronary pressure during saline infusion in the occluded culprit artery, divided by the flow rate of the infused saline. The primary endpoint was to assess the diagnostic performance of Rinfarction to predict MVO on CMR performed at 2–7 days. The secondary endpoint was a composite of all-cause mortality or hospitalisation for heart failure up to 5 years.
Results:
A total of 82 patients were included. The area under the Receiver-Operating Characteristic curve of Rinfarction to predict MVO and IMH was 0.84 and 0.78, respectively. The optimal cut-off value for both MVO and IMH was 1000 Wood units (WU). The composite endpoint of all-cause mortality or hospitalisation for heart failure occurred in 15.6% and 2.3% in the Rinfarction ≥1000 WU and Rinfarction <1000 WU groups, respectively ($p=0.06$).
Conclusion:
Rinfarction is able to predict MVI in STEMI before reperfusion and may serve as a tool in future trials to select patients that might benefit most from experimental therapies.

Keywords:
Acute myocardial infarction, Coronary physiology, Microvascular injury

Figure:
Pressure (green) and temperature (blue) tracings of two different patients with corresponding cardiac magnetic resonance imaging studies (CMR). Panel A shows a minimal change in distal coronary pressure (ΔPd) relative to the coronary wedge pressure (Pw) during saline infusion at a rate of 20 mL/min. The infarct-related myocardial resistance (Rinfarction) in this patient was 250 Wood units. Microvascular injury was not observed in this patient (Panel B). The distal coronary pressure in Panel C, from a different patient, shows a remarkable increase during saline infusion at a rate of 20 ml/min. The Rinfarction was 4500 Wood units and the CMR study of this patient revealed extensive microvascular injury with signs of both microvascular obstruction and intramyocardial hemorrhage (Panel D, red asterisk).

Session 4: Coronary heart disease & prevention
Abstract 4

Progression of Coronary Artery Calcification in Melanoma Patients Treated with Immune Checkpoint Inhibitors Assessed on Routine Non-gated CT Scans

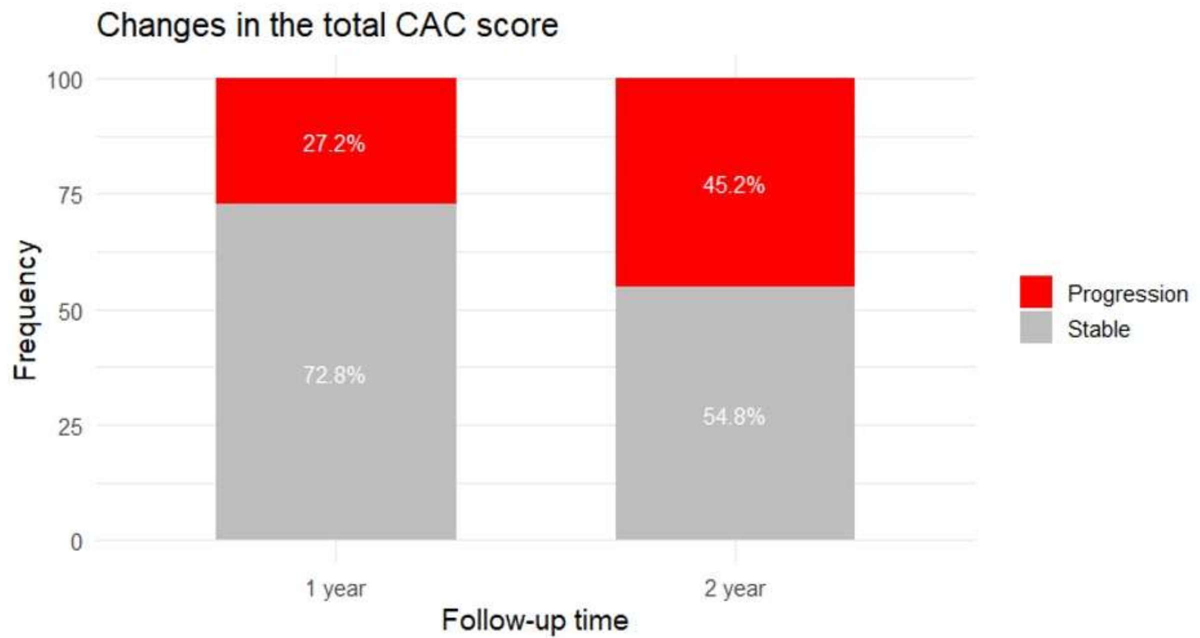
Presenting author: N. Laachir
Department: Hartziekten

N. Laachir (LUMC, Leiden); N. Laachir (LUMC, Leiden); E. Kapiteijn (LUMC, Leiden); J.W Jukema (LUMC, Leiden); M.L. Antoni (LUMC, Leiden)

Purpose:
To evaluate longitudinal changes in coronary artery calcification (CAC) as a marker of atherosclerosis in melanoma patients treated with immune checkpoint inhibitors (ICIs).
Methods:
This retrospective cohort study included patients with stage III–IV melanoma treated with ICIs between 2012 and 2024 who underwent serial CT imaging during follow-up. CAC was assessed at baseline and at 1- and 2-year follow-up using a visual ordinal scoring system on routine non-gated CT scans. Changes in CAC over time were analyzed using paired Wilcoxon signed-rank tests and mixed-effects models.
Results:
95 patients were included; 93 and 62 underwent CT imaging at 1- and 2-year follow-up, respectively. At baseline, 53.7% of patients had coronary calcifications. This proportion increased to 60.9% at 1 year and 62.9% at 2 years. CAC scores increased significantly at both follow-up time points (both $p<0.001$). CAC progression was observed in 27.2% of patients at 1 year and in 45.2% at 2 years. Mixed-effects modeling showed significantly higher odds of increased CAC at 1 year ($\beta = 2.72$, SE 0.58; $p < 0.001$) and 2 years ($\beta = 5.61$, SE 0.91; $p < 0.001$) compared with baseline. At baseline, statin users had significantly higher CAC scores and a higher prevalence of CAC compared with non-users ($p<0.001$); however, no significant difference in CAC progression was observed between groups.
Conclusion:
Melanoma patients treated with ICIs demonstrate significant progression of CAC during follow-up. Simple visual CAC assessment on routine non-gated CT scans may allow identification and monitoring of atherosclerotic disease progression in this population.

Keywords:
Immune Checkpoint inhibitors, Atherosclerosis, Ordinal score

Figure:
The percentage of patients demonstrating progression of the ordinal score at 1-year (n=93 patients) and 2-year (n=62 patients) follow-up after the start of ICI compared to the baseline ordinal score



Session 4: Coronary heart disease & prevention
Abstract 5

Direct versus Late maxLCBI4mm Changes after Paclitaxel--coated Balloon Treatment of Lipid--rich Plaques

Presenting author: T.N. Dijkstra
Department: Cardiology

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Purpose:
Lipid--rich plaques are a frequent cause of adverse cardiovascular events. Paclitaxel--coated balloons (PCB) can be used for focal pre--emptive treatment of lipid--rich plaques (LRPs) in non--culprit coronary lesions. However, the evolution of intracoronary imaging features after PCB--treatment remains inadequately understood. This post--hoc analysis of the DEBuT-LRP study aimed to evaluate direct versus late changes in intracoronary imaging features stratified per treated vessel.
Methods:
In DEBuT--LRP, 20 patients with non--ST--segment elevation acute coronary syndrome underwent PCB treatment of a non--culprit lipid--rich plaque, identified by three--vessel intravascular ultrasound and near--infrared spectroscopy after percutaneous coronary intervention of flow--limiting lesions. PCB inflation was performed under nominal pressure for an inflation duration of at least 60 seconds. LRPs were defined as a maximum lipid--core burden index in a four millimeter segment (maxLCBI4mm) of >325.
Intracoronary imaging was repeated immediately post--procedure and at 9--month follow-up. MaxLCBI4mm was analyzed using the Wilcoxon signed--rank test for pairwise changes and Kruskal--Wallis test for inter--vessel differences.
Results:
Complete intracoronary imaging at baseline, directly post--PCB treatment and at 9--month follow--up was available in 14 patients. The median MaxLCBI4mm in treated segments significantly decreased from 461 (IQR 315-536) at baseline to 233 (IQR 124-375) at 9-months ($p < 0.01$), with a significant reduction from directly post--PCB (400 with IQR 286-516) to 9-months ($p = 0.01$). No significant reduction was observed from baseline to post-PCB ($p = 0.57$). Stratified analysis per vessel showed a significant reduction in maxLCBI4mm over 9 months in the left circumflex artery ($n = 7$, $p = 0.02$), while changes in the left anterior descending artery ($n = 4$, $p = 0.25$) and right coronary artery ($n = 3$, $p = 0.50$) were not significant. However, inter--vessel comparisons showed no significant differences in maxLCBI4mm reduction across the different coronary arteries (baseline to post--PCB: $p = 0.99$, baseline to 9 months: $p = 0.67$, post--PCB to 9 months: $p = 0.60$).
Conclusion:
Our findings demonstrate that PCB treatment of LRPs leads to a significant reduction in

maxLCBI4mm over 9 months, with similar effects across the different coronary arteries. The absence of immediate post--PCB changes suggests a gradual biological response to paclitaxel rather than an immediate lipid modification effect caused by the balloon inflation. This supports the potential of drug--coated balloon therapy in altering plaque composition over time. Future large--scale studies are warranted to confirm these findings, explore predictors of response, and evaluate the clinical implications for long-term cardiovascular risk reduction.

Keywords:
Vulnerable plaque, IVUS-NIRS, Paclitaxel-coated balloon

Figure:

Table 1. Core laboratory-adjudicated imaging outcomes per PCB-treated vessel

	Baseline	Post-DCB	9 months	Absolute change baseline to post-PCB	Baseline to post-PCB p-value[1]	Absolute change baseline to 9M	Baseline to 9M p-value[1]	Absolute change post-PCB to 9M	Post-PCB to 9M p-value[1]
LAD (n=4)	525 [252 to 545]	357 [240 to 617]	328 [77 to 519]	-5 [-234 to 131]	0.88	-118 [-263 to -17,3]	0.25	-113 [-394 to 217]	0.63
RCX (n=7)	422 [356 to 800]	393 [309 to 698]	206 [99 to 345]	-31 [-102 to 36]	0.58	-151 [-430 to -70]	**0.02**	-187 [-283 to 85]	**0.02**
RCA (n=3)	332 [115 to 499]	406 [202 to 437]	255 [132 to 352]	-62 [-130 to 0]	1.00	-147 [-200 to 0]	0.50	-85 [-151 to 0]	0.25
Total (n=14)	461 [315 to 536]	400 [286 to 516]	233 [124 to 375]	-35,5 [-109 to 74]	0.57	-139 [-311 to -55,3]	**<0.01**	-137 [-234 to -62,3]	**0.01**
p-value[2]				0.99		0.67		0.60	

Data are median [IQR]. [1]P-value derived from Wilcoxon signed rank test. [2]P-value derived from Kruskall-Wallis test comparing all coronary arteries. LAD: left anterior descending artery, PCB: paclitaxel-coated balloon, RCA: right coronary artery, RCX: ramus circumflexus.

Session 4: Coronary heart disease & prevention
Abstract 6

Direct Mobilization after Successful Femoral Deployment of an Angio-Seal VIP Post Coronary Angiography or Percutaneous Coronary Intervention: Results of the Move-it Pilot Study

Presenting author: R.L.I. Jonkman
Department: Cardiology

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Purpose:
Routine post-procedural immobilization after transfemoral coronary procedures (TCP) aims to prevent vascular complications but may delay recovery and prolong hospitalization. With vascular closure devices, the necessity of immobilization is questioned. The MOVE-IT pilot study evaluated the safety and feasibility of immediate mobilization after TCP using Angio-Seal VIP– closure device (Terumo Europe N.V., Leuven, Belgium).
Methods:
This prospective, single-center pilot study included 50 consecutive patients undergoing transfemoral coronary angiography or percutaneous coronary intervention (PCI) using 6–8 French sheaths. Patients mobilized immediately after successful Angio-Seal VIP deployment. The primary outcome was a composite endpoint of access-site bleeding (≥ BARC 3), vascular complications, requirement for vascular intervention, and vasovagal reactions. Secondary outcomes included time to mobilization, time to discharge, patient satisfaction, and pain scores. Outcomes were assessed immediately after the procedure, at 1 and 2 hours, and at 30-days.
Results:
Mean age was 68.2 ± 9.1 years; 26% were female and 50% underwent PCI. A 6 Fr sheath was used in 84% of patients, and 44% received 5,000 IU heparin. Most patients were on aspirin (34%) or aspirin with P2Y12 inhibitors (42%). Prior to Angio-Seal VIP deployment, mean arterial blood pressure was 96.8 ± 2.3 mmHg and mean ACT was 243.7 ± 85.7 seconds. Mean time to mobilization was 5.0 ± 2.5 minutes, mean time to discharge was 4.7 ± 1.5 hours. Minor bleeding (BARC 1–2) occurred in 12%; no major bleeding or vascular complications were observed (table 1).
Conclusion:
Immediate mobilization after TCP using Angio-Seal VIP appears safe, feasible, and well tolerated.

Keywords:
Femoral access, Vascular closure device, Immediate mobilization

Figure:
*N=47
**Acute occlusion, dissection, perforation, pseudo-aneurysm, infection, vascular intervention

Table 1: Study outcomes

Primary endpoints	All patients N = 50 (%)
Bleeding	6 (12)
BARC 1	2 (4)
BARC 2	4 (8)
BARC >2	-
Haematoma's*	23 (49)
Minor <5cm	12 (26)
Major >5cm	11 (23)
Vascular complications**	-
Angioseal deployment failure	-
Vasovagal response	1 (2)

Session 4: Coronary heart disease & prevention
Abstract 7

Association between Socioeconomic Status and Cardiovascular Outcomes after PCI

Presenting author: S. Janssen
Department: Cardiology

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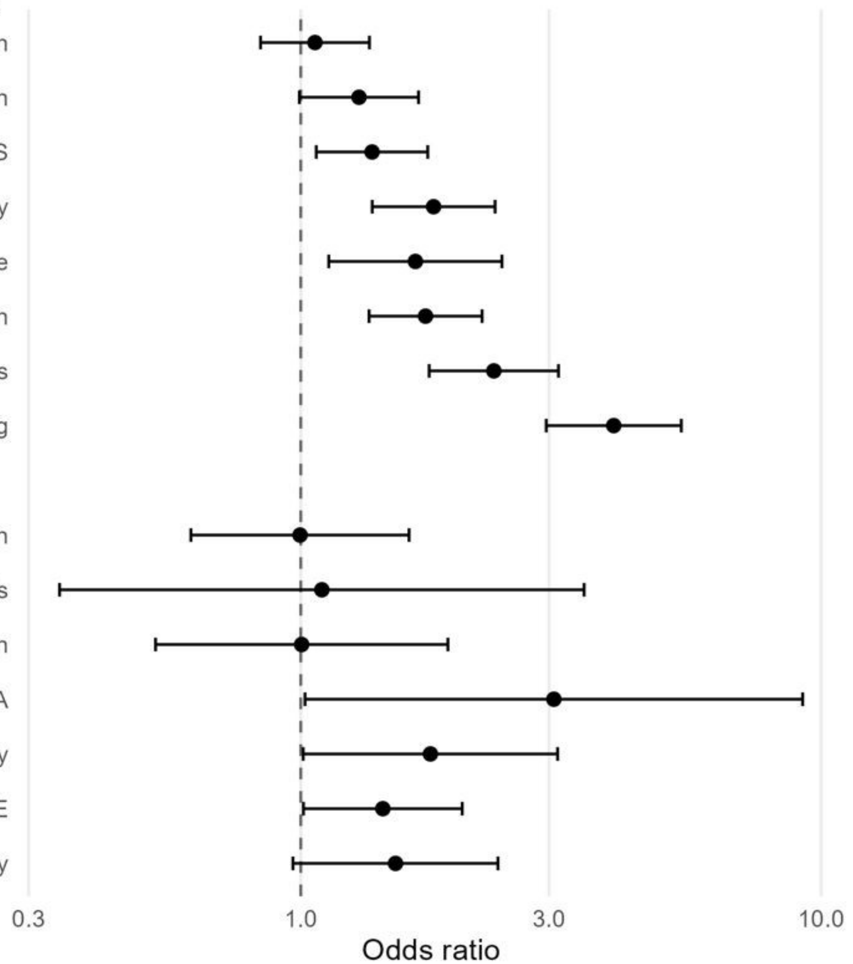
Purpose:
Socioeconomic status (SES) has been associated with cardiovascular outcomes, yet contemporary data from regional PCI cohorts in the Netherlands remain limited. We investigated the association between SES, baseline characteristics, and cardiovascular outcomes in a large registry of patients treated with percutaneous coronary intervention (PCI).
Methods:
Data were obtained from the Southeast Netherlands Heart Registry (ZON-HR), an ongoing, multicentre PCI registry. SES scores were determined by linkage of patients' residential postal code to publicly available data from Statistics Netherlands (CBS) and analysed as a continuous variable. Patients with available SES score and complete 1-year follow-up were included. Associations with baseline characteristics and 1-year outcomes were assessed using logistic regression.
Results:
SES score and complete 1-year follow-up were available for 6,424 patients. Lower SES was associated with higher odds of acute coronary syndrome (OR 1.37, 95% CI 1.07–1.75), obesity (OR 1.80, 95%CI 1.37-2.36), peripheral artery disease (OR 1.66, 95% CI 1.13–2.44), hypertension (OR 1.74, 95% CI 1.35–2.23), diabetes (OR 2.35, 95% CI 1.77–3.13), and active smoking (OR 4.00, 95% CI 2.96–5.39). Regarding 1-year outcomes, lower SES was associated with a higher risk of major adverse cardiac and cerebrovascular events (MACCE) (OR 1.44, 95% CI 1.01-2.04), primarily driven by increased risk of ischemic cerebrovascular accident (iCVA) and cardiovascular mortality. After multivariable adjustment, SES did not remain an independent predictor of MACCE (OR 1.51, 95%CI 0.86-2.65).
Conclusion:
Lower SES was associated with a less favourable cardiovascular risk profile and higher unadjusted rates of MACCE 1 year after PCI.

Keywords:
Socioeconomic status, Percutaneous coronary intervention, Cardiovascular outcomes

Figure:
Figure 1: Forest plot of odds ratios with 95% confidence intervals for the association between lower socioeconomic status and baseline characteristics, and clinical outcomes 1 year after PCI.
ACS, acute coronary syndrome; iCVA, ischemic cerebrovascular accident; MACCE, major adverse cardiac and cerebrovascular events; PCI, percutaneous coronary intervention.



Session 4: Coronary heart disease & prevention
Abstract 8

Current Adoption of ESC Guidelines for Intracoronary Imaging in Complex Percutaneous Coronary Interventions in the Netherlands

Presenting author: F.D. Bosman
Department: Cardiology

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Purpose:
Intracoronary imaging-guided percutaneous coronary intervention (PCI), using either intravascular ultrasound (IVUS) or optical coherence tomography (OCT), has demonstrated superiority over angiography alone in improving clinical outcomes in patients with complex coronary artery disease. As a result, the 2024 ESC guidelines upgraded the use of imaging in complex PCI to a Class I, Level A recommendation, explicitly in left main lesions, true bifurcations, and long lesions. The aim of this study was to assess the adoption of the recent guidelines regarding the use of intracoronary imaging in Dutch hospitals during complex PCI.

Methods:
This study included patients from the netherlands heart registration who underwent a complex PCI between April and September 2025. A complex PCI was defined as the presence of at least one lesion meeting one or more of the following criteria: left main, ostial, in-stent restenosis, true bifurcations, long (stent length ≥ 38mm), severely calcified (use of calcium modification techniques), and chronic total occlusions (CTO). The primary endpoint was the proportion of intracoronary imaging use, either IVUS or OCT. Secondary endpoints included the proportion of intracoronary imaging use per complex lesion type, as well as variability in its use across centers and operators.

Results:
Of the 5,407 PCI procedures performed in 8 hospitals, 2,412 (44.6%) were classified as complex, with intracoronary imaging applied in 410 (17.0%) of these complex cases. Among the complex lesions, long lesions were the most prevalent (57.4%), followed by ostial lesions (31.1%), true bifurcations (22.2%), left main (15.9%), CTO (12.0%), in-stent restenosis (10.5%), and severely calcified lesions (10.0%). Of the three lesion types explicitly mentioned in the guidelines, intracoronary imaging was most frequently employed in left main lesions (38.5%), followed by true bifurcations (22.2%) and long lesions (16.5%). Among the other lesion types, intracoronary imaging was most frequently applied in severely calcified lesions (30.0%), followed by ostial lesions (21.2%), in-stent restenosis (19.3%), and CTO (11.1%). A strong variation in intracoronary imaging use was observed across centers, ranging from 7.9% to 40.1%, with a median of 11.6%.

Conclusion:
Intracoronary imaging was used in a minority of complex PCI with considerable variation across centers and lesion types. A dedicated project to implement the current guidelines

could help increase the adoption of intracoronary imaging and improve outcomes for patients undergoing complex PCI.

Keywords:
Intracoronary imaging, Complex PCI,

Session 5: Heart failure
Abstract 1

The Influence of Cardiovascular Risk-related Comorbidities on the Development of Dilated Cardiomyopathy

Presenting author: N.J. Beelen
Department: Cardiology

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Purpose:
Dilated cardiomyopathy (DCM) is a multifactorial disease, which genetic, environmental factors, as well as comorbidities, contribute to disease development. However, the individual and combined role that hypertension, diabetes mellitus, and obesity play in disease development remains largely unknown. This study aims to research the effect of these comorbidities and their potential interplay on DCM development.

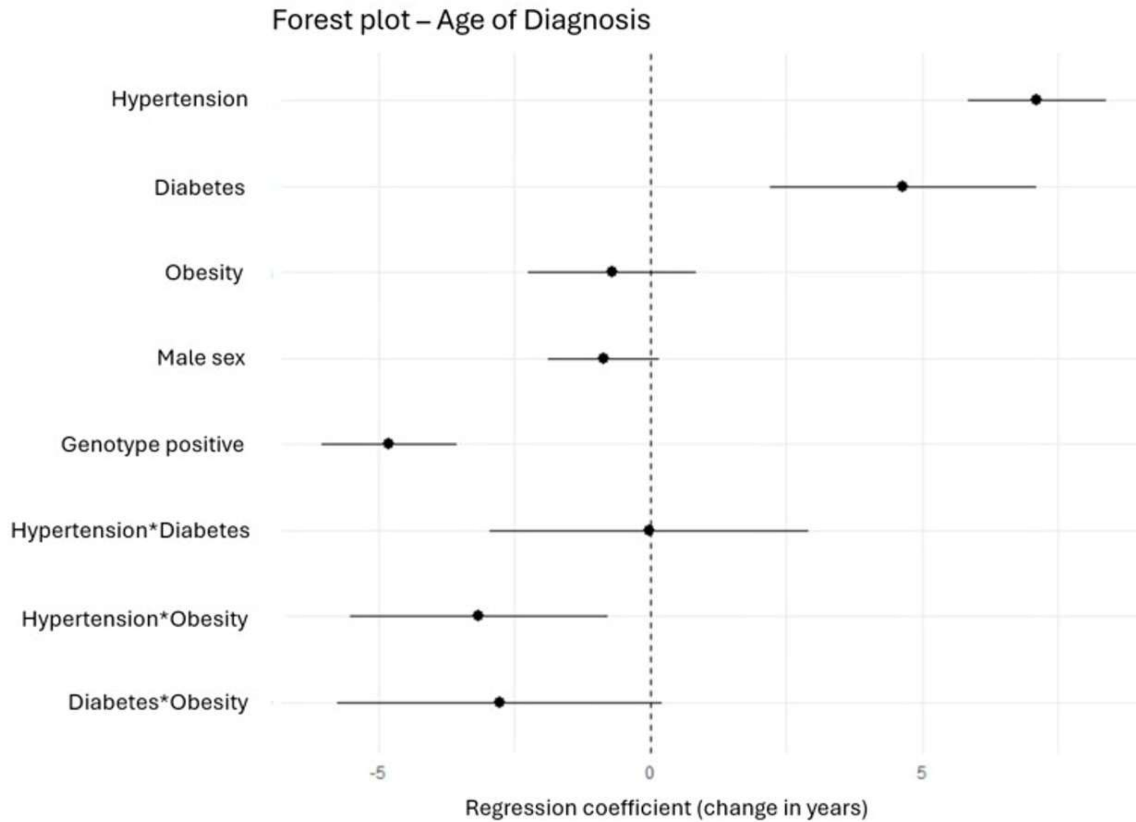
Methods:
Patients with DCM and a control group of unaffected relatives were included from nine international centers. The presence of hypertension, diabetes mellitus and obesity prior to diagnosis was assessed, using multivariable regression analysis, in order to evaluate their influence on DCM development and age at diagnosis.

Results:
In total, 3809 patients were included (36.6% female; mean age 51.5±14.0; (likely) pathogenic variant carriers 16.7%), along with 457 unaffected relatives (62.9% female; mean age 44.9±15.6; (likely) pathogenic variant carriers 29.2%). Hypertension, diabetes, male sex, and genotype negative carriers were independently associated with a later age at diagnosis (Figure 1). Obesity was not associated with a earlier or later age at diagnosis when considered in isolation. However, obesity modified the effect of hypertension and diabetes, shifting towards an earlier age of onset in patients with combined obesity and hypertension ($p<.01$), with a similar trend for obesity and diabetes ($p=.07$) (Figure 1).

Conclusion:
When considering the interplay between comorbidities, obesity appears to accelerate the development of DCM. Hypertension and diabetes were associated with an earlier age of onset, only in the presence of obesity. The underlying mechanisms driving these effects need to be further studied.

Keywords:
Dilated cardiomyopathy, Comorbidities, Cardiovascular risk

Figure:
Figure 1. Forest plot showing regression coefficients for age of dilated cardiomyopathy diagnosis. Coefficient were derived from multivariable regression analysis. Positive coefficients indicate later age of diagnosis, negative coefficients indicate earlier age of diagnosis, * indicates interaction term between two variables. Black points indicate regression coefficients, horizontal lines indicate 95% confidence intervals.



Session 5: Heart failure
Abstract 2

External Validation of the EHMRG30-ST Score for Short-Term Mortality Risk Stratification in European Patients With Acute Decompensated Heart Failure

Presenting author: D. Mouha
Department: Cardiology

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Purpose:
Acute decompensated heart failure (ADHF) is associated with high short-term mortality and healthcare burden. Risk scores may guide clinical decisions, including early discharge or hospital-at-home strategies. This study aimed to externally validate the Emergency Heart Failure Mortality Risk Grade (EHMRG) 30-day score in a European hospitalized ADHF cohort.

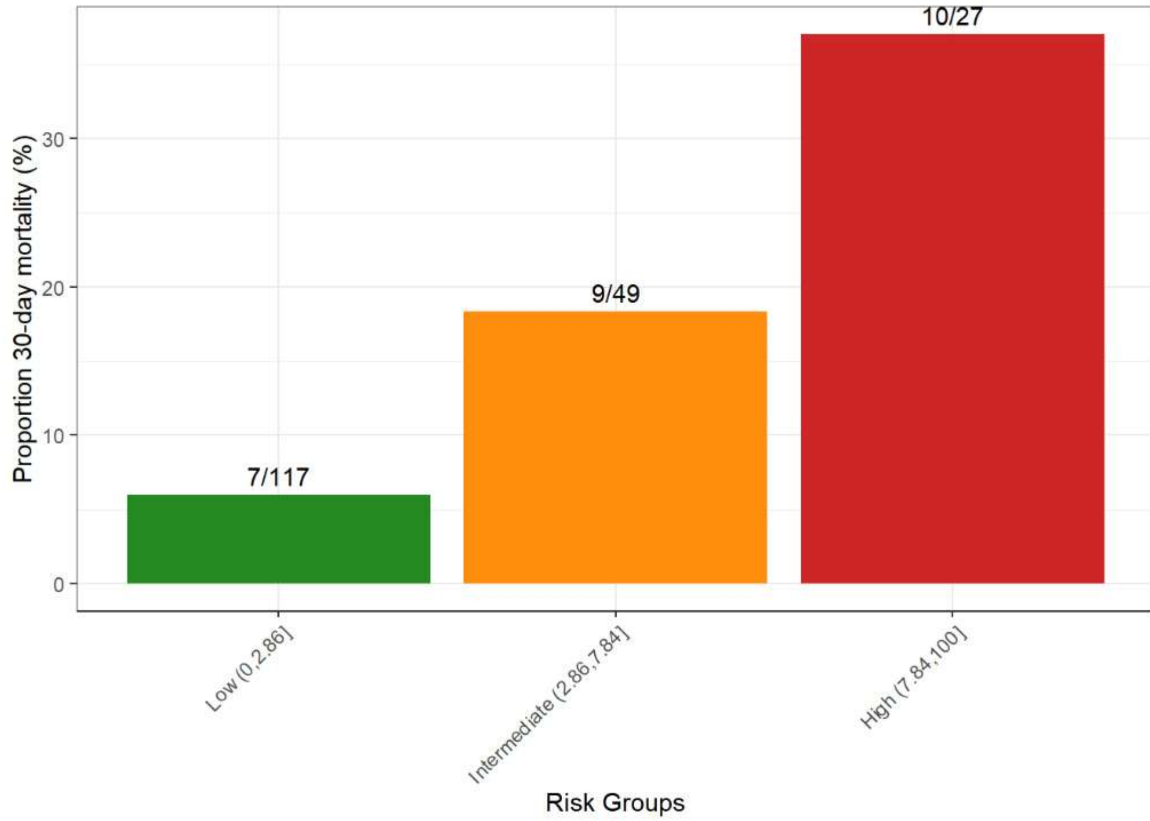
Methods:
We conducted a retrospective cohort study of consecutive ADHF admissions to a tertiary center in the Netherlands (January–December 2022). EHMRG 30-day scores were calculated using demographic, clinical, and laboratory data at presentation, classifying patients into low, intermediate, or high-risk strata. The primary outcome was 30-day all-cause mortality. Discrimination was assessed by receiver operating characteristic analysis, and calibration by the Hosmer–Lemeshow test.

Results:
Among 270 eligible patients, 193 had complete data. Median age was 71 years (IQR 61–77); 60.1% were male. Most patients were low risk (60.6%), followed by intermediate (25.4%) and high risk (14.0%). Thirty-day mortality increased across strata, highest in the high-risk group (37.0%). Area under the curve was 0.749 (95% CI 0.649–0.848). Calibration showed systematic underestimation of observed mortality (Hosmer–Lemeshow $P<0.001$).

Conclusion:
In this European cohort, the EHMRG 30-day score demonstrated fair discrimination but poor calibration. Recalibration and prospective validation are required before routine clinical implementation.

Keywords:
Acute decompensated heart failure, Risk stratification, 30-day mortality

Figure:
Mortality rate and number of patients in each risk group.



Session 5: Heart failure
Abstract 3

Elevated hsCRP Unmasks a Distinct Metabolic-Inflammatory HFpEF Phenotype

Presenting author: E. Verghote
Department: Cardiology

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Purpose:
An hsCRP threshold ≥2 mg/L has been used to identify heart failure patients with preserved ejection fraction (HFpEF) with a heightened inflammatory state at increased risk. We aimed to evaluate whether hsCRP ≥2 mg/L defines a distinct clinical HFpEF phenotype, and evaluate its prognostic association.
Methods:
This single-centre prospective observational cohort study included HFpEF patients diagnosed via a specialised outpatient clinic. Clinical features were compared between patients with low (<2 mg/L) and high (≥2 mg/L) baseline hsCRP levels. Factors associated with high hsCRP and its prognostic value were assessed for heart failure hospitalisation or all-cause mortality.
Results:
Among 401 HFpEF patients (mean age, 75 years; 68% female), median hsCRP was 2.4 mg/L [1.2, 5.6]. Low and high hsCRP was measured in 171 (43%) and 230 (57%) patients, respectively. Patients with high hsCRP were more often obese (55.2% vs 31%, $p < 0.001$). High hsCRP was independently associated with higher body mass index (OR 1.10, 95% CI 1.05-1.15, $p < 0.001$), lower eGFR (OR 0.99, 95% CI 0.97-1.00, $p = 0.046$) and increased low-density lipoprotein concentrations (OR 1.33, 95% CI 1.02-1.76, $p = 0.036$). Prognosis was worse in patients with high versus low hsCRP (97 (40.2%) vs 45 (26.3%) events, log rank $p = 0.0058$), which remained significant after multivariable adjustment (HR 1.42, 95% CI 1.13-1.77, $p = 0.002$).
Conclusion:
HFpEF patients with hsCRP ≥ 2 mg/L exhibit a distinct metabolic-inflammatory profile, providing a basis for data-driven identification of patients with elevated hsCRP, who may potentially benefit from emerging anti-inflammatory therapies.

Keywords:
HFpEF, hsCRP, Inflammation

Figure:
Table 1: Univariable and multivariable logistic regression models identifying factors associated with high hsCRP. Model 1 represents univariable analysis; Model 2 represents multivariable analysis including all covariates; Model 3 corresponds to the final multivariable model derived using Akaike's Information Criterion. Abbreviations: BMI, body mass index; COPD, chronic obstructive pulmonary disease; eGFR, estimated glomerular filtration rate; LDL, low-density lipoprotein; CI, confidence interval; OR, odds ratio.

	Model 1			**Model 2**			**Model 3**		
Characteristic	**OR**	**95% CI**	**p-value**	**OR**	**95% CI**	**p-value**	**OR**	**95% CI**	**p-value**
Age (years)	0.98	0.96, 1.01	0.3	1.00	0.96, 1.05	0.8	1.00	0.96, 1.05	0.8
Sex									
Female	—	—		—	—		—	—	
Male	1.21	0.79, 1.86	0.4	1.50	0.86, 2.66	0.2	1.51	0.88, 2.64	0.14
BMI (kg/m²)	1.12	1.07, 1.16	**<0.001**	1.09	1.04, 1.16	**<0.001**	1.10	1.05, 1.15	**<0.001**
Diabetes Mellitus	1.53	0.96, 2.47	0.075	1.29	0.70, 2.40	0.4			
Sleepapnea	1.48	0.89, 2.51	0.14	0.84	0.43, 1.62	0.6			
Hypertension	1.14	0.72, 1.79	0.6	1.16	0.64, 2.11	0.6			
Atrial Fibrillation	1.26	0.84, 1.88	0.3	1.17	0.70, 1.95	0.5			
Coronary Artery Disease	0.65	0.37, 1.15	0.14	0.65	0.35, 1.21	0.2	0.64	0.34, 1.20	0.2
COPD	1.60	0.93, 2.83	0.10	1.36	0.69, 2.73	0.4	1.41	0.72, 2.83	0.3
eGFR (mL/min/1.73m²)	0.98	0.97, 0.99	**0.003**	0.99	0.97, 1.00	0.059	0.99	0.97, 1.00	**0.046**
Transferrin saturation (%)	0.97	0.95, 0.99	**0.003**	0.98	0.95, 1.00	0.078	0.97	0.95, 1.00	0.067
LDL (mmol/L)	1.27	1.04, 1.57	**0.019**	1.35	1.03, 1.79	**0.033**	1.33	1.02, 1.76	**0.036**

Session 5: Heart failure
Abstract 4

Development of a Risk Score to Predict Heart Failure in Patients receiving Coronary Artery Bypass Grafting Surgery

Presenting author: T.H. Ris
Department: Cardiology

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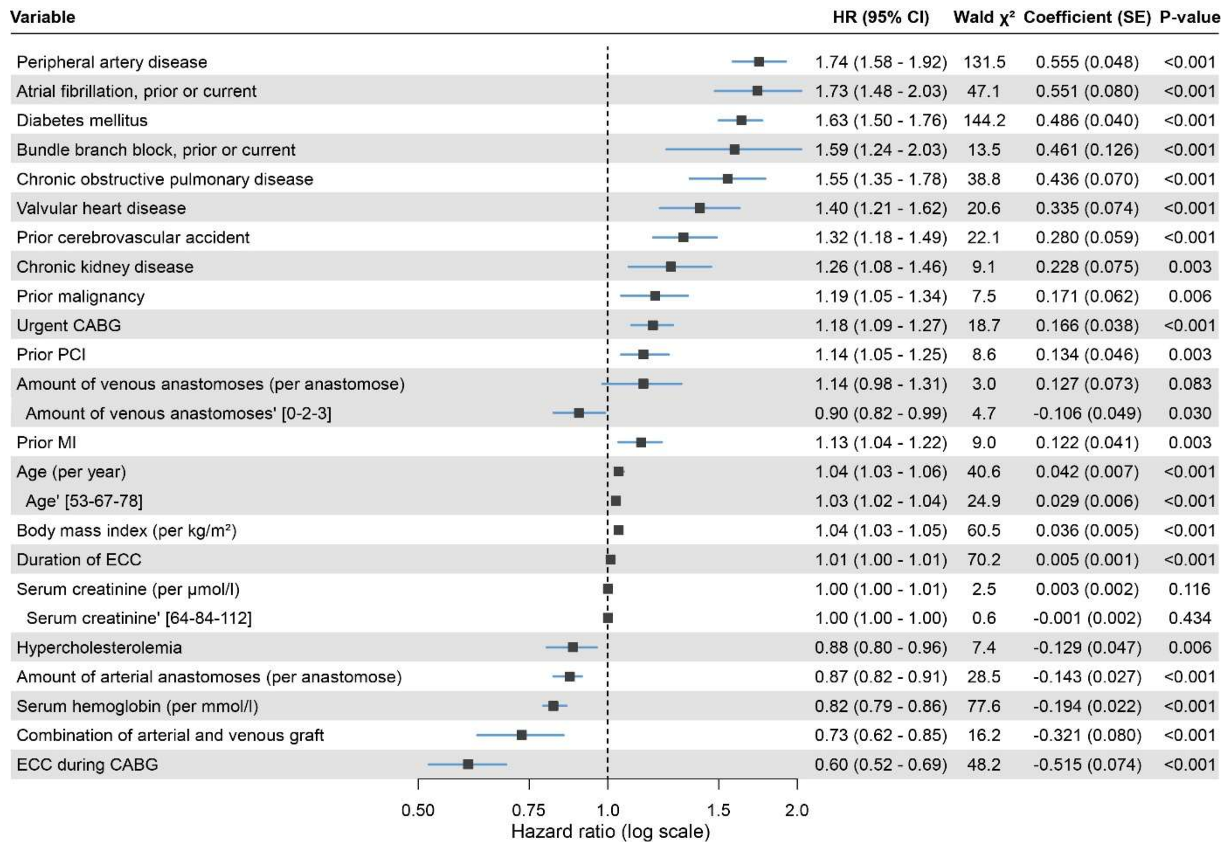
Purpose:
Heart failure (HF) after coronary artery bypass grafting (CABG) is associated with poor long-term outcomes. Early identification of patients at high risk for post-CABG HF and subsequent cardiovascular (CV) mortality is warranted, yet determinants among patients undergoing bypass surgery with preserved left ventricular ejection fraction (LVEF) remain poorly defined. We aimed to develop clinical risk models to predict HF hospitalization and CV mortality after isolated CABG in patients with normal baseline LVEF.
Methods:
Nationwide cohort study using data from the Netherlands Heart Registration linked with the national cause of death registry and Dutch Hospital Data. All patients undergoing isolated isolated CABG between 2013 and 2023 were eligible. Those with unavailable outcome data or unsuccessful data linkage, LVEF <50% or unknown LVEF or prior HF hospitalization were excluded. The primary endpoint was a composite of HF hospitalization and CV mortality. Secondary endpoints were HF hospitalization and CV mortality. Cox regression with backward stepwise selection (p<0.10) was used. Model performance was evaluated using the area under the curve (AUC).
Results:
Among 48.062 patients (mean age 66.16±9.40 years; 9,476 [19.7%] female) followed for a median of 4.6 years (IQR 2.3-7.1), 2,895 patients (6.0%) experienced the primary endpoint. The final model included 22 predictors and is shown in Figure 1. The primary model AUC was 0.755 (95%CI: 0.745-0.764), with good calibration at 1-, 3-, and 5-year follow-up. Endpoint-specific models had AUCs of 0.748 (95%CI: 0.735-0.761) for HF hospitalization and 0.773 (95%CI: 0.759-0.786) for CV mortality. An online calculator was developed to estimate an individual's risk to experience the primary endpoint at the time of CABG (http://hoek.shinyapps.io/CABG-HF).
Conclusion:
We developed risk models that accurately predict HF hospitalization and CV mortality after isolated CABG with preserved LVEF. These models may support informed perioperative planning, closer follow-up, and timely implementation of preventive strategies of patients at high risk of these cardiac sequelae after CABG.

Keywords:
Heart Failure, Prior Coronary Artery Bypass Grafting, Risk Model

Figure:
Forest plot of the risk prediction model for the primary composite endpoint of heart failure hospitalization and cardiovascular mortality.
Abbreviations: CABG: coronary artery bypass grafting, CI: confidence interval, ECC: extracorporeal circulation, HR: hazard ratio, MI: myocardial infarction, PCI: percutaneous coronary intervention, SE: standard error.



Session 5: Heart failure
Abstract 5

Abnormal Left Atrial Strain Predicts Dilated Cardiomyopathy Development in Asymptomatic Relatives

Presenting author: M.F.G.H.M. Venner
Department: Cardiologie

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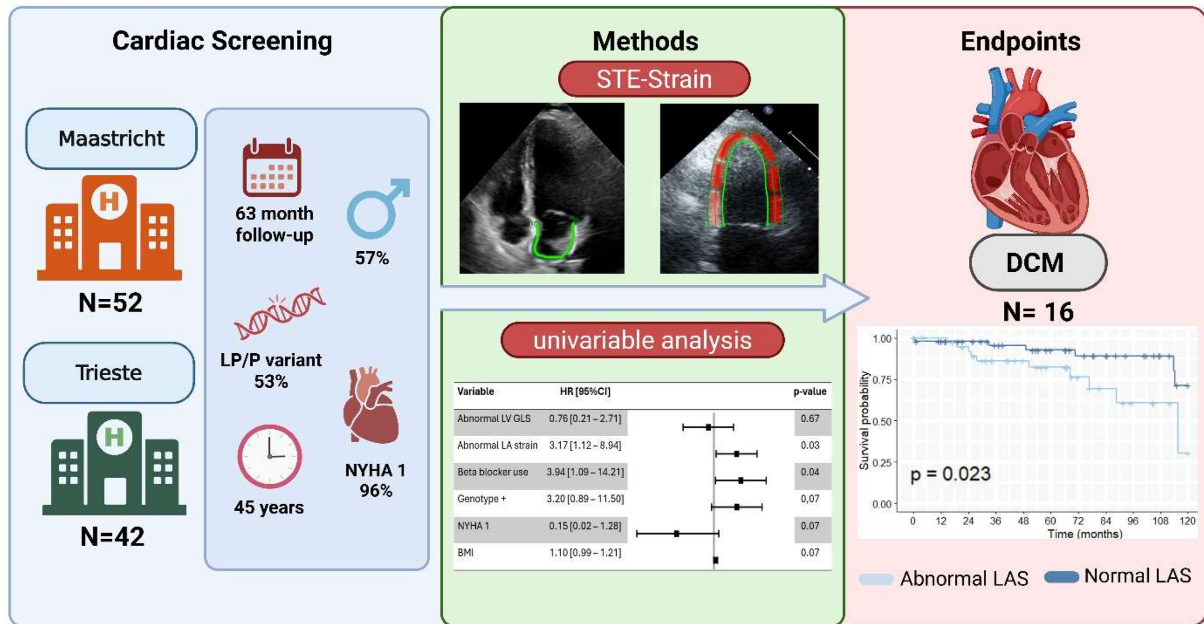
Purpose:
Speckle tracking echocardiography (STE) of the left atrium (LA) is a novel imaging technique capable of detecting subtle cardiac dysfunction. This study evaluated whether LA STE can predict DCM development in asymptomatic DCM relatives.
Methods:
DCM relatives were included from two international centers. The predictive value of baseline echocardiographic LA (reservoir, conduit, and booster) strain was studied in asymptomatic DCM relatives(LVEF >50% and LVEDD <2 z-scores). The primary endpoint was DCM development, based on current guidelines. Cubic spline analysis was performed to dichotomize all strain variables. Survival analysis was performed to determine the value of strain-derived parameters to predict DCM development.
Results:
Sixteen of the 94 asymptomatic included relatives (median age 45 [33-56] years, 57% male), developed DCM (17%) during a median follow-up of 63 months (IQR: 30-94 months). The predictive cut-off value derived from cubic spline analysis for LA conduit strain was 28.0%. Univariable analysis showed that LA conduit strain (HR: 3.17, 95%-confidence interval [CI]:1.12-8.94, p=0.03) and beta-blocker use(HR:3.94, 95%-CI:1.09-14.21, p=0.04) were associated with DCM development, while a trend was observed for NYHA-1(HR:0.15, 95%-CI:0.02-1.28, p=0.07), BMI(HR:1.10, 95%-CI:0.99-1.21, p=0.07) and presence of genetic variant(HR:3.20, 95%-CI:0.89-11.50, p=0.07). An abnormal LA conduit strain at baseline was associated with a significantly higher risk of DCM development (Kaplan Meier analysis; p=0.023).
Conclusion:
Abnormal echocardiographic LA conduit strain is associated with future DCM development in asymptomatic family members. Incorporation of LA strain parameters into routine cardiac screening may improve risk stratification and help identify relatives at increased risk who could benefit from closer follow-up or early intervention.

Keywords:
Echocardiography, Speckle tracking strain analysis, Family members

Figure:
Central illustration



Session 5: Heart failure
Abstract 6

Intubation Rather Than Cardiac Arrest as a Predictor of Mortality in Acute Myocardial Infarction-Related Cardiogenic Shock

Presenting author: S. ten Berg
Department: Cardiologie

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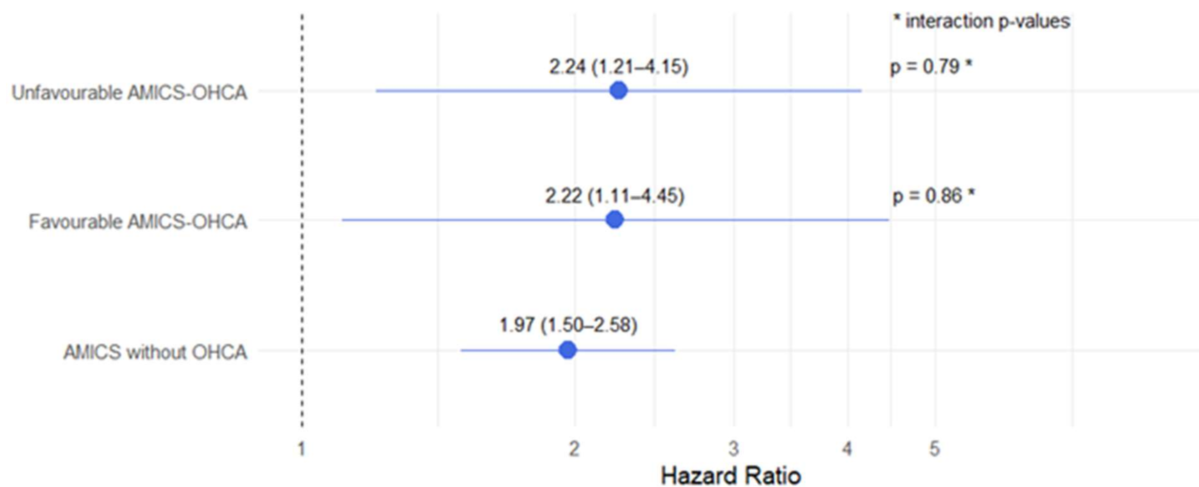
Purpose:
The Society for Cardiovascular Angiography and Intervention (SCAI) has suggested an arrest modifier for patients with anoxic brain injury to each cardiogenic shock (CS) stage. However, outcomes differ between those with favourable and unfavourable out-of-hospital cardiac arrest (OHCA) characteristics. Intubation might capture a wider spectrum of critical illness and may alternatively predict mortality in patients with acute myocardial infarction related CS (AMICS), with and without OHCA. We aimed (1) To assess whether using 'arrest' as a modifier in the SCAI classification is justified, by comparing 30-day mortality risk in AMICS patients without OHCA, favourable and unfavourable AMICS-OHCA patients, and- 2) To evaluate the impact of intubation on 30-day mortality across all 3 abovementioned categories of AMICS patients.
Methods:
We used data from the Netherlands Heart Registration (2017–2021) from 14 hospitals, including patients with AMICS undergoing percutaneous coronary intervention. Patients were stratified into 3 subgroups; AMICS without OHCA, favourable AMICS-OHCA (witnessed arrest and Return of Spontaneous Circulation <30 minutes) and unfavourable AMICS-OHCA. Multivariable Cox regression was used to compare 30-day mortality between the three groups and subsequent subgroup analyses assessed the association between intubation and 30-day mortality in each group.
Results:
In total 2226 patients were included (AMICS without OHCA = 1313, favourable AMICS-OHCA = 490 and unfavourable AMICS-OHCA = 423). Favourable AMICS-OHCA was associated with lower (HR 0.67, 95%-CI 0.53– 0.84), but unfavourable AMICS-OHCA with similar adjusted risk of 30-day mortality compared to AMICS without OHCA. Intubation was associated with higher 30-day mortality across all groups.
Conclusion:
In AMICS patients undergoing PCI, 30-day mortality risk was lower in patients with favourable OHCA compared to those without OHCA. Intubation was an independent predictor for 30-day mortality in all subgroups. These findings support further research to determine whether intubation, rather than arrest, is a robust clinical marker suitable for inclusion in the SCAI shock classification.

Keywords:
Cardiogenic shock, Intubation, Cardiac arrest

Figure:
Multivariable Cox regression results predicting 30-day mortality. Results are shown as Hazard Ratios with 95% Confidence Intervals. Interaction p-values are shown for the interaction term between intubation and patient subgroup (AMICS without OHCA, favourable AMICS-OHCA, and unfavourable AMICS-OHCA).
The models were adjusted for intubation, age, diabetes, MAP, heart rate, IHCA, lactate, hemoglobin, glucose, creatinine, and IRA RCA.
Gender, BMI, STEMI, prior event, complaints >3 hours, IRA LM and LAD, and multivessel disease were included in the multivariable regression model, but were not independently associated with 30-day mortality in any of the subgroups.
BMI = body mass index, NSTEMI = non-ST-elevation myocardial infarction, IHCA = in-hospital cardiac arrest, IRA = Infarct related artery, LM = left main, LAD = left anterior descending, RCA = right coronary artery



Session 5: Heart failure
Abstract 7

Phospholamban Cardiomyopathy: From in Vitro Disease Modeling to Therapy

Presenting author: F.E. Deiman
Department: Department of Cardiology

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Purpose:
Phospholamban (PLN) p.Arg14del (R14del) is a pathogenic variant that can lead to heart failure (HF). Phospholamban antisense oligonucleotides (PLN-ASOs) have shown therapeutic promise for HF in murine models, including PLN R14del. Here, we identify the therapeutic mechanisms of PLN-ASOs in a human in vitro PLN R14del model.

Methods:
To study therapeutic mechanisms of PLN-ASOs, CRISPR-Cas9 engineered PLN R14del and isogenic control (WT) induced pluripotent stem cell-derived cardiomyocytes (iPSC-CMs) were extensively characterized before and after PLN-ASO therapy, including calcium transients, contractility, mitochondrial respiration, protein aggregation, the proteome and phosphoproteome, and validated in PLN R14del iPSC-CMs derived from a PLN R14del patient.

Results:
PLN-ASOs dose-dependently reduced PLN mRNA and protein levels in iPSC-CMs, and 62 differentially expressed proteins (DEPs) and 372 differentially expressed phosphorylation sites (DEPSs) were identified. Gene ontology enrichment was performed on the identified DEPs and DEPSs, to identify related biological processes. Here, proteomics confirmed PLN-ASO induced PLN protein downregulation, and an altered protein expression pattern related to cellular metabolism and mitochondria. Phosphoproteomics demonstrated that PLN-ASOs alter phosphorylation sites related to transcription, calcium handling and contractility. In line with this, functional characterization of PLN R14del iPSC-CMs revealed that PLN-ASOs enhance calcium uptake and release kinetics. In line with this, PLN-ASOs also enhance contractile kinetics by decreasing the time to contraction and relaxation. Lastly, PLN-ASOs dose-dependently enhance metabolism by increasing basal respiration and ATP production and reducing PLN R14del induced PLN/LC3 protein clusters.

Conclusion:
PLN R14del cardiomyocytes have a degenerative phenotype characterized by PLN/LC3 clustering, a proxy for PLN protein aggregation. The therapeutic mechanism of PLN-ASOs in PLN R14del cardiomyopathy include enhancement of mitochondrial respiration, calcium- and contractile kinetics and reduction of PLN/LC3 clusters.

Keywords:
Cardiomyopathies, Phospholamban, RNA Therapy

Figure:
Functional characterization of PLN-ASO therapy in iPSC-CMs. A) PLN-ASOs dose-dependently reduce PLN mRNA expression and protein levels. B) PLN-ASOs enhance calcium- and contractile kinetics. C) PLN-ASOs dose dependently enhance metabolism by increasing basal respiration and ATP production. D) PLN-ASOs reduce PLN/LC3 clusters, a proxy for PLN protein aggregation.