ABSTRACTS
NVVC Najaarscongres
Donderdag 5 november
09.00 – 10.30 uur

SESSIE 2: Heart Rhythm

	Zaal: 4/5	Voorzitters: Leontine Wentrup, verpleegkundig specialist Amsterdam UMC dr. Rob Roudijk, AOIS Radboud UMC
1	09.00 - 09.10	**Inequalities in early resuscitation after out-of-hospital cardiac arrest: sex, socioeconomic status and location** *Mevrouw Cheyenne Campbell, LUMC, Leiden*
2	09.11 - 09.21	**Concomitant Ablation for Atrial Fibrillation During Cardiac Surgery: Adoption, Inter-centre Variation and Real-World Outcomes from the Netherlands Heart Registration** *Mevrouw Miriam Scheurwater, Catharina Ziekenhuis,Eindhoven*
3	09.22 - 09.32	**Beyond Survival: Quality of Life in Patients with Idiopathic Ventricular Fibrillation** *Mevrouw Rozan Roodenburg, UMC Utrecht, Utrecht*
4	09.33 - 09.43	**Reassessing the role of surgical ablation in atrial fibrillation: a single-centre analysis of postoperative outcomes** *Mevrouw Agustina Bayon, Medisch Spectrum Twente, Enschede*
5	09.44 - 09.54	**Mitral regurgitation improvement after thoracoscopic ablation of atrial fibrillation reflects rhythm restoration and atrial reverse remodeling** *De heer Marc Terpstra, Amsterdam UMC, Amsterdam*
6	09.55 - 10.05	**Durability of Pulmonary Vein Isolation Using a Variable-loop Pulsed Field Ablation Catheter in Patients with Paroxysmal Atrial Fibrillation: A Prospective Mandatory Remap Study** *Mevrouw Antje Nikkels van der Veen, Erasmus MC, Rotterdam*
7	10.06 - 10.16	**Protamine for Heparin Reversal and Femoral Access-Site Bleeding after Atrial Fibrillation Catheter Ablation** *De heer Moustafa Ghafar, LUMC, Leiden*
8	10.17 - 10.27	**Electrocardiographic changes in healthy women with uncomplicated pregnancy: the influence of gestational age, fundal height, and parity** *Mevrouw Deborah Kalkman, Amsterdam UMC, Amsterdam*

Session 2: Heart Rhythm
Abstract 1

Inequalities in early resuscitation after out-of-hospital cardiac arrest: sex, socioeconomic status and location

Presenting author: C.S.R. Campbell
Department: Cardiology

C.S.R. Campbell (LUMC, Leiden); C. Campbell (LUMC, Leiden); J. Al-Gully (LUMC, Leiden); G. Liao (LUMC, Leiden); J.W. Jukema (LUMC, Leiden); I. Al Amri (LUMC, Leiden); B.O. Bingen (LUMC, Leiden); M.C. den Haan (LUMC, Leiden)

Purpose:
Out-of-hospital cardiac arrest (OHCA) has persistently low survival. Early bystander cardiopulmonary resuscitation (CPR) and timely automated external defibrillator (AED) use are critical links in the chain of survival. Therefore, the aim of this study was to examine the associations between sex, socioeconomic status (SES), and arrest location with bystander CPR, pre-EMS AED use, and one-year mortality within a Dutch OHCA cohort.
Methods:
We performed a single-center retrospective cohort study of adults (≥18 years) with OHCA transported to the emergency department of an academic hospital (2018-2022). SES was derived from the SES score by Statistics Netherlands (CBS) and categorized as low, middle or high. Primary outcomes were bystander CPR (any chest compressions with/without ventilation before emergency medical services arrival) and pre-EMS AED use (AED applied before EMS arrival, irrespective of shock delivery). Secondary outcomes were one-year all-cause mortality and one-year cardiac mortality. Multivariable logistic regression provided odds ratios with 95% confidence intervals (CI).
Results:
Among 565 patients, bystander CPR was less frequent for arrests at home than in public settings (OR 0.37, 95% CI 0.17□0.82). Pre-EMS AED use was less frequent in the middle SES category compared with the high SES category (OR 0.09, 95% CI 0.01-0.67), and more common in men than women (OR 2.78, 95% CI 1.07□7.21). No associations were observed for one-year cardiac mortality. One-year all-cause mortality was lower in patients with a shockable initial rhythm and higher following arrests occurring at home.
Conclusion:
Sex, SES, and location-related disparities were observed in early resuscitation with lower pre-EMS AED use in women and the middle SES category and a trend in the lower SES category. These findings suggest that disparities in early resuscitation contribute to differences in outcomes and support the need for targeted strategies to increase bystander CPR and pre-EMS AED use, particularly for arrests occurring at home and among underrepresented groups.

Keywords:
OHCA

Session 2: Heart Rhythm
Abstract 2

Concomitant Ablation for Atrial Fibrillation During Cardiac Surgery: Adoption, Inter-centre Variation and Real-World Outcomes from the Netherlands Heart Registration

Presenting author: M.A. Scheurwater
Department: Cardiology

M.A. Scheurwater (Catharina hospital, Eindhoven); M.A. Scheurwater (Catharina hospital, Eindhoven); M.A. Bayon (Medisch Spectrum Twente, Enschede); D.N. Schulz (Catharina hospital, Eindhoven); M.M. Roefs (Netherlands Heart Registration, Utrecht); Y. Blaauw (University Medical Centre Groningen, Groningen); B. Maesen (Maastricht University Medical Centre, Maastricht); J.G.L.M. Luermans (Maastricht University Medical Centre, Maastricht); A.H.G. Driessen (Amsterdam University Medical Centre, Amsterdam); J.R. de Groot (Amsterdam University Medical Centre, Amsterdam); D. van Veghel (Catharina hospital, Eindhoven); L.R.C. Dekker (Catharina hospital, Eindhoven); T.J. van Brakel (Catharina hospital, Eindhoven, on behalf of the Cardiothoracic Surgery Registration Committee of the Netherlands Heart Registration.

Purpose:
Clinical guidelines recommend concomitant surgical ablation (CSA) for atrial fibrillation (AF) during cardiac surgery based on RCTs and meta-analyses using freedom from AF as endpoint. Contemporary, data on CSA utilization, inter-centre variation, and patient-centred outcomes beyond rhythm, remain limited. Using nationwide real-world data, we quantified CSA use, inter-centre variation, and its association with clinical outcomes, quality of life (QoL) and healthcare utilization.
Methods:
This nationwide, registry-based retrospective cohort study analysed Netherlands Heart Registration data (2017–2024) of AF patients undergoing cardiac surgery. To account for selection bias, inverse probability of treatment weighting was applied across seven surgical subgroups. Outcomes included mortality, complications, 1-year QoL (SF-36), and 1-year healthcare utilization.
Results:
Among 9128 patients, 4171 (45.7%) underwent CSA. Institutional variation occurred across all surgery types (e.g., mitral valve: 16%–90%; CABG: 0%–77%). CSA was preferentially performed in healthier patients (e.g., younger, elective surgery, and less comorbidity), yet was not consistently associated with reductions in stroke or mortality. CSA was associated with improved 1-year physical QoL in 3 surgical subgroups (CABG, AVR, and aortic surgery), higher postoperative electrical cardioversion rates, and with fewer hospital readmissions across multiple surgical cohorts.
Conclusion:
CSA is used in 45.7% of AF patients undergoing cardiac surgery in the Netherlands, with substantial inter-centre variation (0%-90%). While CSA was not consistently associated with hard clinical endpoints, it showed benefits in physical recovery and reduced hospital readmissions in several subgroups. Future research should prioritize socio-economic outcomes and long-term healthcare utilization to determine the true value of CSA.

Keywords:
Concomitant Surgical Ablation, Cardiothoracic Surgery, Real-World Data

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Abstract 3

Beyond Survival: Quality of Life in Patients with Idiopathic Ventricular Fibrillation

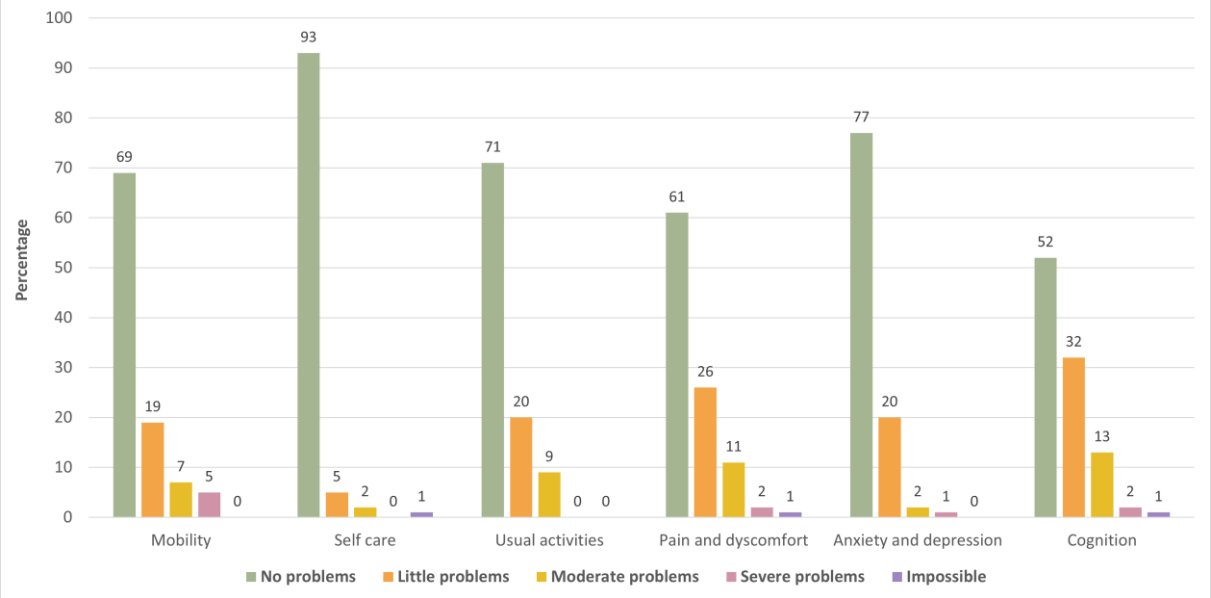
Presenting author: R. Roodenburg
Department: Cardiologie

R. Roodenburg (UMC Utrecht, Utrecht); R. Roodenburg (UMC Utrecht, Utrecht); L.M. Verheul (UMC Utrecht, Utrecht);, S.J. Wierdsma (Amsterdam UMC, Amsterdam); J.C. Balt (St. Antoniusziekenhuis, Nieuwegein); P.G. Postema (Amsterdam UMC, Amsterdam); J.M.A. Visser-Meily (UMC Utrecht, Utrecht); R.J. Hassink (UMC Utrecht, Utrecht)

Purpose:
Idiopathic ventricular fibrillation (IVF) is diagnosed in survivors of sudden cardiac arrest, when no underlying cause is identified despite extensive diagnostic evaluation. The physical and (neuro)psychological consequences of a cardiac arrest, combined with prognostic uncertainty of IVF, may adversely affect quality of life. This study aimed to assess general health-related quality of life (HR-QoL) in patients with IVF.
Methods:
We included patients from the Dutch IVF registry who were initially diagnosed with IVF. HR-QoL was measured using the EuroQol-5 Dimensions (EQ-5D), including an extra question on cognition and a Visual Analogue Scale (EQ-VAS).
Results:
In total, 124 patients were included. Of these 57% were male, mean age at index event was 42 (SD: 14) years and median follow-up duration was 8 years (IQR: 3-15). There were 9 patients (7%) who received an alternative diagnosis during follow-up.
In total 31% of patients reported any problems in mobility, 7% in self care, 29% in usual activities, 30% in pain/discomfort, 23% in anxiety/depression and 48% in cognition. (Figure 1)
The median EQ-VAS score was 80 (IQR: 73-90).
Conclusion:
Even though the overall HR-QoL of IVF patients is good, there is a substantial group of patients who report problems in any of the domains of the EQ-5D. Cognitive problems are particularly common and may substantially affect quality of life, as these generally young patients are expected to work and remain active in a demanding daily life for many years. This indicates that IVF patients might benefit from additional support during rehabilitation, to improve their long-term HR-QoL.

Keywords:
Idiopathic Ventricular Fibrillation, Health-Related Quality of Life, Cognition

Figure:
Results of the EQ-5D + cognition on health-related quality of life in 124 patients with idiopathic ventricular fibrillation



Session 2: Heart Rhythm
Abstract 4

Reassessing the role of surgical ablation in atrial fibrillation: a single-centre analysis of postoperative outcomes

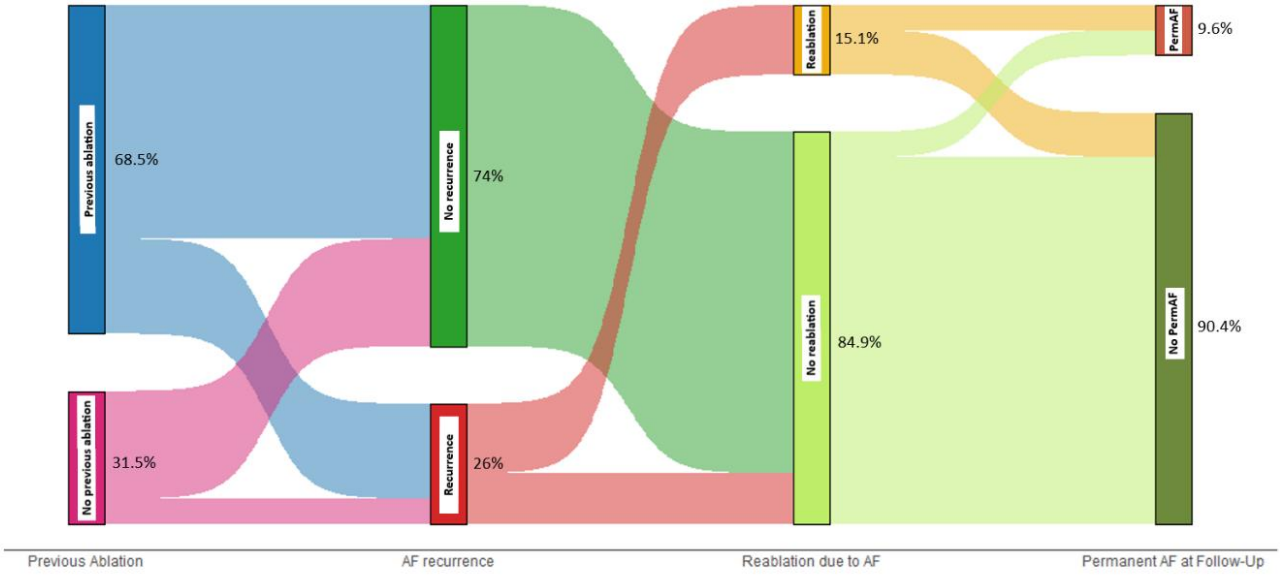
Presenting author: M. A. Bayon
Department: Cardiothoracale chirurgie

M. A. Bayon; M. A. Bayon; M. D Bogaard; J.M. van Opstal; R. G. H. Speekenbrink, Medisch Spectrum Twente, Enschede

Purpose:
Although catheter ablation (CA) is a cornerstone of rhythm control therapy for atrial fibrillation (AF), the role of surgical ablation (SA) as an alternative treatment in selected patients remains debated. This study evaluated the outcomes of SA following structured referral and multidisciplinary patient selection.
Methods:
This retrospective, single-centre descriptive study included patients with AF undergoing SA (pulmonary vein and posterior box isolation with left atrial appendage exclusion) between 2020 and 2025. Indications for SA included previous unsuccessful CA without an identifiable target for repeat ablation, unsuitability for CA, and clinical characteristics associated with a high risk of AF recurrence after CA. Clinical data were obtained from the treating institution and referring hospitals. Short- and mid-term postoperative outcomes were evaluated.
Results:
A total of 73 patients were included. Mean age was 61.1 (SD 7.7); 40 patients (54,8%) were male, 43 (58,9%) had paroxysmal AF and 20 (27,8%) were receiving antiarrhythmic drugs. 50 patients (68.5%) had previously undergone CA, with a mean of 1.9 previous ablation procedures (SD 0.96). Median follow-up was 3.6 years (IQR 2.4–4.9). Repeat AF ablation was required in 11 patients (15.1%), after a median of 2.7 years (IQR 1.5–3.4). Progression to permanent AF occurred in 7 patients (9.6%), while recurrent AF was observed in 19 patients (26.0%). Overall, 42 patients (57.5%) remained free from atrial tachyarrhythmias during follow-up.
Conclusion:
In patients with previous unsuccessful CA(s) or in whom CA is considered unsuitable, SA represents a valuable alternative or escalation strategy for AF treatment, with acceptable mid-term outcomes.

Keywords:
atrial fibrillation, surgical ablation,

Figure:
Flow chart of outcomes after surgical ablation



Session 2: Heart Rhythm
Abstract 5

Mitral regurgitation improvement after thoracoscopic ablation of atrial fibrillation reflects rhythm restoration and atrial reverse remodeling.

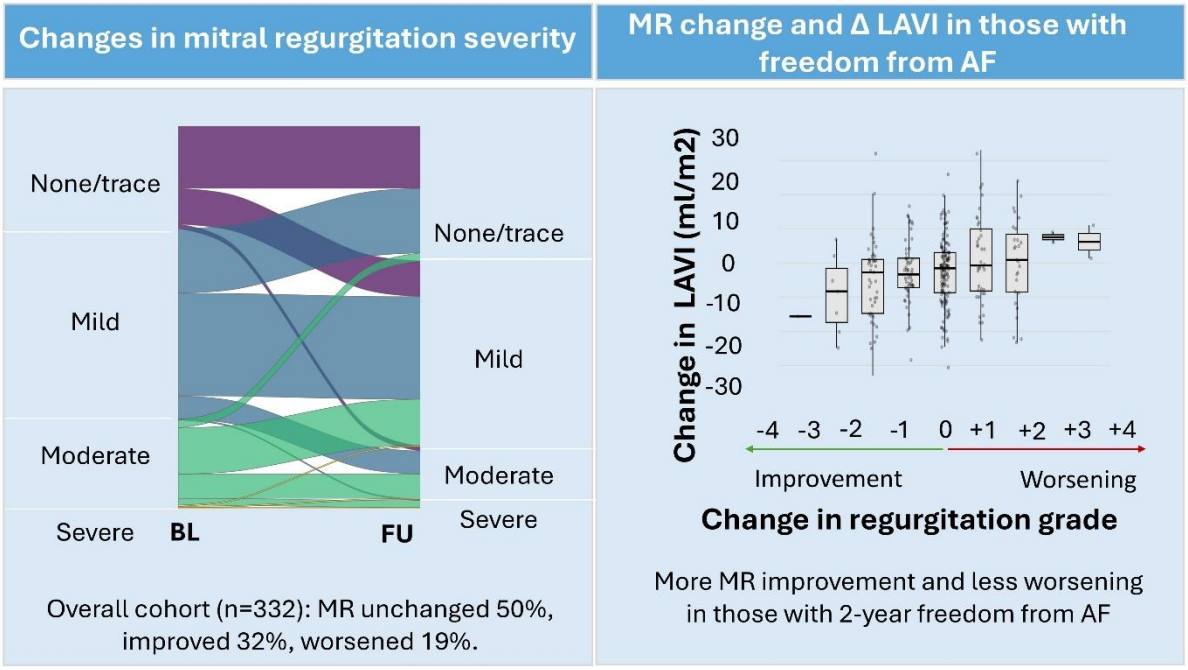
Presenting author: M.M. Terpstra
Department: Cardiology

M.M. Terpstra; M.M. Terpstra (Amsterdam UMC, Amsterdam); J.A. Winkelman (Amsterdam UMC, Amsterdam); P. Zappala (S. Antonius, Nieuwegein); R.H.A.C.M de Bruin-Bon (Amsterdam UMC, Amsterdam); Z. Dong MD (Amsterdam UMC, Amsterdam); T.A.C. de Vries (Radboud UMC, Nijmegen); I. Jansen (Amsterdam UMC, Amsterdam); F.R. Piersma (Amsterdam UMC, Amsterdam); J.S.S.G. de Jong (OLVG, Amsterdam); B.J. Bouma (Amsterdam UMC, Amsterdam); W.J.P. van Boven (Amsterdam UMC, Amsterdam); A.H.G. Driessen (Amsterdam UMC, Amsterdam); J.R. de Groot (Amsterdam UMC, Amsterdam)

Purpose:
Atrial fibrillation (AF) frequently coexists with secondary mitral regurgitation (MR). MR may improve after AF ablation through sinus rhythm restoration and atrial reverse remodeling. Their relative contributions to MR severity changes are incompletely understood. We aimed to identify risk factors of MR severity following thoracoscopic AF ablation and evaluate whether MR improvement is associated with subsequent rhythm outcome.
Methods:
This sub-analysis of MARK-AF, a single-arm prospective cohort study on patients undergoing thoracoscopic AF ablation, included patients without primary MR (2015–2023). MR severity was assessed at baseline and 6–9-months. Rhythm status was systematically assessed through 24 months. Multivariable ordinal regression identified risk factors for follow-up MR severity. Landmark analyses evaluated AF recurrence after follow-up echocardiography in patients without early recurrence.
Results:
Among 332 patients (62±9 years, 26% women, 71% persistent AF), MR improved in 32% and worsened in 19% following thoracoscopic ablation. Baseline MR severity was the strongest risk factor for follow-up MR severity (OR:4.90, CI:3.17–7.57; p<0.001). Early recurrence (before follow-up echocardiography) was associated with higher MR grades at 6-9-months (OR:2.00, CI:1.02–3.92; p=0.044), as were increases in left atrial volume index (LAVI) and NT-proBNP. In patients without early recurrence, MR improvement was accompanied by a graded reduction in LAVI (p-trend<0.001). MR improvement was time-dependently associated with lower subsequent AF recurrence risk, strongest early after follow-up echocardiography (overall p=0.010; 90-day HR:0.29, CI:0.11–0.73).
Conclusion:
MR after thoracoscopic AF ablation improves with combined sustained sinus rhythm and reverse atrial remodeling, and identifies patients with more favorable subsequent rhythm outcome.

Keywords:
Atrial functional mitral regurgitation, Atrial cardiomyopathy, Surgical ablation outcome

Figure:
Thoracoscopic AF ablation is associated with meaningful reductions in secondary MR. MR improvement appears to depend on both sustained sinus rhythm and the extent of atrial reverse remodeling. AF: atrial fibrillation; BL: baseline; LAVI: left atrial volume index; MR: mitral regurgitation.



Session 2: Heart Rhythm
Abstract 6

Durability of Pulmonary Vein Isolation Using a Variable-loop Pulsed Field Ablation Catheter in Patients with Paroxysmal Atrial Fibrillation: A Prospective Mandatory Remap Study

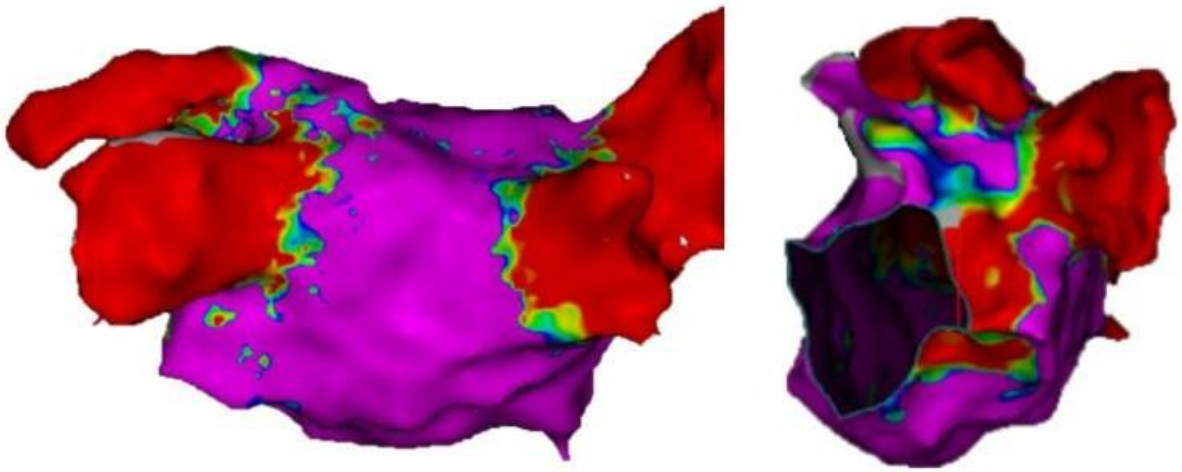
Presenting author: A.A.I. Nikkels van der Veen
Department: Cardiology

A.A.I. Nikkels van der Veen (Erasmus Medical Center, Rotterdam); A.A.I. Nikkels van der Veen (Erasmus Medical Center, Rotterdam); B.K. Mahmoodi (Erasmus Medical Center, Rotterdam); M.G. Hoogendijk (Erasmus Medical Center, Rotterdam); Nick van Boven (Erasmus Medical Center, Rotterdam); R.E. Bhagwandien (Erasmus Medical Center, Rotterdam); S.C. Yap (Erasmus Medical Center, Rotterdam)

Purpose:
Lesion durability after pulmonary vein isolation with the VARIPULSE platform (Biosense Webster, USA) is unknown. This study assessed the durability of pulmonary vein isolation (PVI) in patients with paroxysmal atrial fibrillation who were treated with the VARIPULSE platform.
Methods:
The variable-loop VARIPULSE catheter was used to achieve PVI. A minimum of 4 ablations per pulmonary vein (PV), with additional ablations at the operator's discretion, were performed to achieve complete PVI. Patients underwent a mandatory remap procedure 2-3 months after the index procedure. The primary outcome was the prevalence of PV reconnection at PV- and patient-level.
Results:
Twenty-five patients were enrolled and 21 patients (male 52%, mean age 60.0±9.3 years) underwent a remap study. Mean procedure time and median [Q1, Q3] fluoroscopy time were 60.9±11.8 and 3.4 [2.1, 6.0] minutes for the index procedure. Remapping revealed that durable isolation was found in 63 of 82 PVs (77%). PVI was durable in 85% of left superior PV, 63% in left inferior PV, 76% in right superior PV, 81% in right inferior PV, and 100% of left common ostium. On a per-patient level, 8 patients (38%) presented with all targeted PVs durably isolated. Reconnection in 1, 2, and 3 PVs occurred in 43%, 10%, and 10%, respectively.
Conclusion:
Durable PV isolation was observed in 77% of the PVs during the repeat procedure, and 38% of all patients showed durable isolation of all PVs.

Keywords:
atrial fibrillation, pulmonary vein isolation, pulsed field ablation

Figure:
Reconnection of the LSPV during the remap procedure



Session 2: Heart Rhythm
Abstract 7

Protamine for Heparin Reversal and Femoral Access-Site Bleeding after Atrial Fibrillation Catheter Ablation

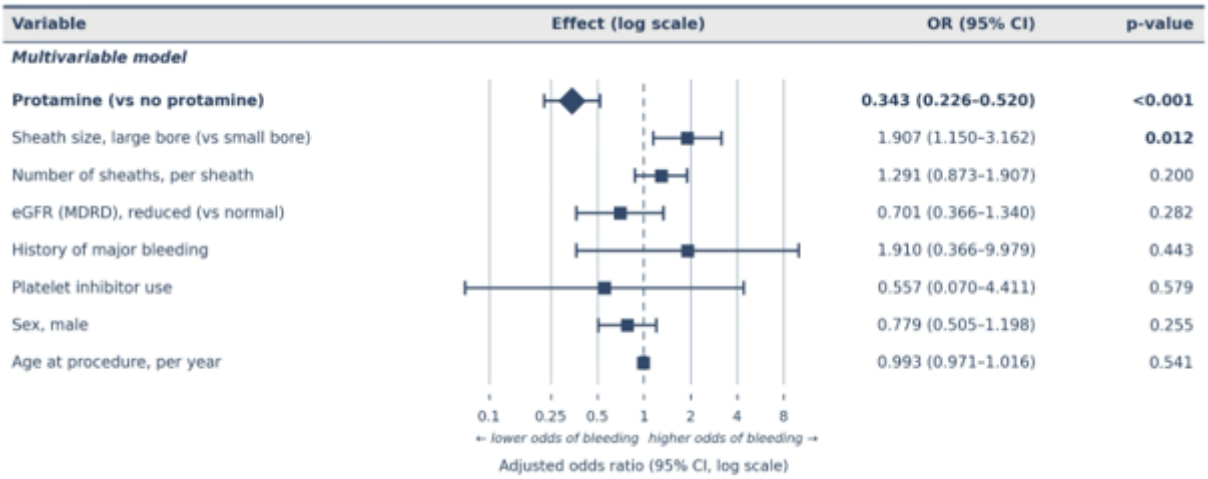
Presenting author: M. Ghafar
Department: Cardiology

M. Ghafar; W. van der Loo (LUMC, Leiden); S.A. Trines (LUMC, Leiden); A.P. Wijnmaalen (LUMC, Leiden); M. de Riva Silva (LUMC, Leiden); K. Zeppenfeld (LUMC, Leiden); S. Piers (LUMC, Leiden)

Purpose:
Femoral access-site bleeding is a common complication after atrial fibrillation (AF) catheter ablation performed under uninterrupted direct oral anticoagulation and unfractionated heparin. Post-procedural protamine may be used to antagonize heparin, but its effect on bleeding outcomes remains unclear. This study assessed whether protamine administration reduces femoral access-site bleeding after AF ablation.
Methods:
This is a retrospective, single-centre cohort study of 1035 patients undergoing AF ablation between 9/2023-12/2025. The first 525 patients did not receive protamine; after a local protocol change in 12/2024, the subsequent 510 patients received standardized protamine administration (5600IU). All patients underwent ultrasound-guided femoral vascular access and figure-of-eight suture. The primary outcome was access-site bleeding of Bleeding Academic Research Consortium grade ≥2. Analyses included multivariable regression and propensity score matching (PSM).
Results:
Access-site bleeding occurred in 17.3% of the no-protamine group versus 7.3% of the protamine group (p<0.001). After adjustment for age, sex, BMI, CHA2DS2VA, platelet-inhibitors, prior major bleed, renal dysfunction, and sheath size and number, protamine was independently associated with lower odds of bleeding (odds ratio (OR) 0.34; 95% confidence interval (95%CI) 0.23-0.52; p<0.001). PSM (414 pairs) showed a bleeding reduction from 18.4% to 6.8% (OR 0.30; 95%CI 0.18-0.49; p<0.001). Post-procedural admission time was 2.3 hours (95%CI 0.5-4.0; p=0.011) shorter in the protamine group. In the protamine group, one patient experienced quickly resolved hypotension and no cerebrovascular events occurred in the protamine group.
Conclusion:
In PSM and regression analyses, protamine administration was associated with 70% lower odds of femoral access-site bleeding and significantly shorter post-procedural admission time after AF ablation.

Keywords:
Protamine, Atrial Fibrillation ablation, Access-site complications

Figure:
OR, odds ratio; CI, confidence interval; BARC, Bleeding Academic Research Consortium; eGFR, estimated glomerular filtration rate; MDRD, Modification of Diet in Renal Disease. The multivariable model entered all covariates simultaneously (forced entry). Reference for protamine is no protamine.



Session 2: Heart Rhythm
Abstract 8

Electrocardiographic changes in healthy women with uncomplicated pregnancy: the influence of gestational age, fundal height, and parity

Presenting author: D.N. Kalkman
Department: Cardiology

J. Houtman (Amsterdam UMC, Amsterdam); J. Houtman, R. Grootenhuis, J.W. Ganzevoort, R.J. Burger, R.J. de Winter, F.W. Asselbergs, M.J. Boonstra, D.N. Kalkman

Purpose:
Pregnancy induces cardiovascular adaptations that may alter electrocardiographic (ECG) parameters. This study investigated associations between ECG parameters and gestational age, fundal height, and parity in healthy women with uncomplicated pregnancies.
Methods:
This interim analysis of the CARRIAGE study included 279 twelve-lead ECGs from 271 healthy pregnant women receiving midwifery-led primary antenatal care. ECG parameters were compared across trimesters using one-way analysis of variance with Tukey's post hoc tests. Differences by gravidity and parity were assessed using Welch's t-tests. Correlations were evaluated using Pearson's correlation coefficient. Linear regression was used to adjust for maternal age, pre-pregnancy weight, and height.
Results:
Heart rate increased progressively across trimesters, from 70.2 ± 9.6 to 85.1 ± 15.3 beats/min, while the QT interval shortened from 364.5 ± 21.0 to 341.7 ± 27.4 ms and QTc increased from 391.9 ± 17.9 to 401.7 ± 17.2 ms (all $p < 0.001$). The PR interval was longer in the first than third trimester (149.0 ± 19.3 vs. 140.1 ± 17.5 ms; $p = 0.005$). The QRS axis weakly inversely correlated with gestational age ($r = -0.13$; $p = 0.026$). Fundal height correlated positively with heart rate ($r = 0.29$) and negatively with QT interval ($r = -0.25$; both $p \leq 0.002$). QRS and T-wave axes differed by parity; pre-pregnancy weight was a significant covariate in regression analyses.
Conclusion:
Pregnancy is associated with progressive changes in heart rate and ventricular repolarization, while cardiac axis changes are subtle. Differences by parity may reflect variations in cardiac adaptation related to previous pregnancies. The findings of this CARRIAGE interim study may improve the understanding of the ECG-changes that occur during uncomplicated pregnancy.

Keywords:
Electrocardiogram, Pregnancy, Cardiac adaptation