PROGRAMMA WETENSCHAPPELIJKE VOORJAARSVERGADERING NVT

31 mei 2024

Nederlandse Vereniging voor
Thoraxchirurgie

Locatie

Van Der Valk Hotel Utrecht
Winthontlaan 4
3526 KV Utrecht

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Algemene Ledenvergadering
Toegang tot de algemene ledenvergadering hebben alle gewone leden van de vereniging, alle bestuursleden, alle ereleden, alle senior leden alsmede de voorzitter en secretaris van de Juniorkamer.

Programma 31 mei 2024

8.30 – 9.00 uur	**Ontvangst en inschrijving**	Foyer
9.00 uur	**Opening door de voorzitter**	
9.15 – 10.30 uur	**Abstract sessie** **Sessievoorzitters**: Foeke Nauta/Arash Khamoosian	Nieuwegracht 2
9.15 uur	**S.H.Q. Beukers** SEX-RELATED DIFFERENCES IN OUTCOMES OF SINGLE- AND MULTI-ARTERIAL CORONARY ARTERY BYPASS GRAFTING: INSIGHTS FROM THE NETHERLANDS HEART REGISTRATION	
9.30 uur	**B.P. Hermans** BIOCOMPATIBILITY OF A NOVEL LUNG SEALANT BASED ON FUNCTIONALIZED POLYOXAZOLINES IN AN OVINE MODEL OF PARENCHYMAL LUNG INJURY	
9.45 uur	**V. van Suylen** HEART TRANSPLANTATION FOLLOWING HEART DONATION AFTER EUTHANASIA: A VALUABLE SUBSET OF THE DONATION AFTER CIRCULATORY DEATH DONOR POOL	
10.00 – 10.30 uur	**Pitch sessie** **Sessievoorzitters**: Foeke Nauta/Arash Khamoosian	
	F. Sampon THORACOSCOPIC-ASSISTED, MINIMALLY INVASIVE VERSUS CONVENTIONAL, OFF-PUMP BYPASS GRAFTING FOR SINGLE VESSEL CORONARY ARTERY DISEASE – A PROPENSITY SCORE MATCHED ANALYSIS	
	S.R. van Dinter INCIDENCE AND PROGRESSION OF PERICARDIAL EFFUSION AFTER CARDIAC SURGERY ON ROUTINE ECHOCARDIOGRAPHY: A SYSTEMATIC REVIEW	
	J.W.T. Boltje THE USE OF PLEDGET-REINFORCED SUTURES DURING SURGICAL AORTIC VALVE REPLACEMENT: A SYSTEMATIC REVIEW AND META ANALYSIS	
	B.J.J. Velders HEMODYNAMIC STRUCTURAL VALVE DETERIORATION AFTER BIOPROSTHETIC AORTIC VALVE REPLACEMENT: IT COMES AND GOES	

10.30 – 11.15 uur	**Koffiepauze**	Nieuwegracht 1
11.15 – 12.15 uur	**Abstract sessie** **Sessievoorzitters**: Bardia Arabkhani/Nimrat Grewal	Nieuwegracht 2
11.15 uur	**M.F.A. Bierhuizen** ATRIAL ELECTROPHYSIOLOGICAL PROPERTIES OF NORMOTHERMIC-PERFUSED HEARTS DONATED AFTER CIRCULATORY DEATH	
11.30 uur	**J. Romeo** ADVANCED ORGAN PROTECTION IN AORTIC ARCH SURGERY: BEATING HEART SURGERY WITHOUT CIRCULATORY ARREST	
11.45 uur	**S. Heuts** PERCUTANEOUS CORONARY INTERVENTION WITH DRUG-ELUTING STENTS VERSUS CORONARY BYPASS SURGERY FOR COMPLEX CORONARY ARTERY DISEASE: A BAYESIAN ANALYSIS OF RANDOMIZED TRIALS	
12.00 uur	**B.J.J. Velders** SURVIVAL AFTER SURGERY FOR TYPE-A AORTIC DISSECTION: A CONTEMPORARY DUTCH NATIONWIDE REGISTRY STUDY	
12.15 – 12.45 uur	**Pitch sessie** **Sessievoorzitters**: Bardia Arabkhani/Nimrat Grewal	
	B.U. Baldan COMPARATIVE ANALYSIS OF THERAPEUTIC STRATEGIES IN POST-CARDIOTOMY CARDIOGENIC SHOCK: INSIGHT INTO A HIGH-VOLUME CARDIAC SURGERY CENTER	
	L. Aerts LONG-TERM OUTCOMES IN HYBRID VERSUS STANDALONE THORACOSCOPIC ABLATION IN PATIENTS WITH ATRIAL FIBRILLATION: A SYSTEMIC REVIEW AND RECONSTRUCTED INDIVIDUAL PATIENT DATA META-ANALYSIS	
	K. Li STAGED HYBRID APPROACH FOR TYPE A ACUTE AORTIC DISSECTION : ZONE 2 ARCH REPLACEMENT AND COMPLETION TEVAR UPON INDICATION	
	T.J. Mandigers IMPACT OF OPEN SURGICAL DESCENDING REPAIR ON AORTIC STIFFNESS AND COMPARISON WITH ENDOVASCULAR REPAIR: ANALYSIS IN AN EX VIVO PORCINE MODEL	

12.45 – 13.45 uur	**Lunchpauze**	Nieuwegracht 1
13.45 – 14.45 uur	**Algemene Ledenvergadering**	Nieuwegracht 2
	Alternatief programma juniorkamer, NP, PA en VS	Oudegracht 1
14.45 – 15.15 uur	**Koffiepauze**	Nieuwegracht 1
15.15 – 16.00 uur	**Themasessie:** Passende zorg – Tijn Kool	Nieuwegracht 2
16.00 – 17.00 uur	**Abstract sessie** **Sessievoorzitters:** Bram van Wijk/	Nieuwegracht 2
16.00 uur	**R.S. Alipour Symakani** VENTRICULO-ARTERIAL COUPLING IN PULMONARY REGURGITATION FOLLOWING TRANSANNULAR PATCH REPAIR OF PULMONARY STENOSIS	
16.15 uur	**M.J. Kawczynski** RIGHT ATRIAL FIBROSIS IS A SIGNIFICANT PREDICTOR OF INCREASED ATRIAL FIBRILLATION BURDEN BUT NOT INCIDENCE DURING 2.5 YEARS OF CONTINUOUS RHYTHM MONITORING AFTER CARDIAC SURGERY	
16.30 uur	**Q.J. Mank** ARTIFICIAL INTELLIGENCE-BASED PULMONARY VESSEL SEGMENTATION: AN OPPORTUNITY FOR AUTOMATED 3D-PLANNING OF LUNG SEGMENTECTOMY	
16.45 uur	**Borrel en uitreiking assistentenprijzen beste abstract presentatie en beste pitch** Ter beschikking gesteld door de Nederlandse Vereniging voor Thoraxchirurgie	Foyer
16.45 – 17.30 uur	**Tekenen voor accreditatie**	Inschrijfbalie

Abstract

09.15 uur

SEX-RELATED DIFFERENCES IN OUTCOMES OF SINGLE- AND MULTI-ARTERIAL CORONARY ARTERY BYPASS GRAFTING: INSIGHTS FROM THE NETHERLANDS HEART REGISTRATION

Sophie H.Q. Beukers[1], Edgar J. Daeter[1], Lineke Derks[2], Geoffrey T.L. Kloppenburg[1] on behalf of the participating centres of the Cardiothoracic Surgery Registration Committee of the Netherlands Heart Registration

[1]Department of cardiothoracic surgery, St. Antonius Hospital, Nieuwegein, The Netherlands
[2]Netherlands Heart Registration, Utrecht, The Netherlands

Objectives
Women are known to suffer from increased mortality and major adverse cardiac events rates (MACCEs) after coronary artery bypass grafting (CABG) compared to men. This study evaluates the effect of sex on revascularization strategies, meaning use of single or multiple arterial grafts (SAG or MAG), and outcomes after CABG.

Methods
Data were gathered retrospectively from the Netherlands Heart Registration database. Patients undergoing isolated CABG were divided into groups treated with SAG or MAG. Using risk adjusted cox proportional hazard regression analysis, the effect of sex on the revascularization strategy and postoperative outcomes was assessed. Secondary analysis was conducted on a subset of patients aged 70 years or younger at baseline.

Results
The study included 51137 patients, of which 19.1% was female. When compared to men, women were older, suffered from more comorbidity in both subgroups and received fewer arterials grafts. Women were more prone to MACCEs (11.2% vs 14.3%, $p<0.001$) and showed inferior survival rates. While use of MAG led to a lower repeat revascularization rate in men ($p=0.022$), this was not the case in women. Cox regression analysis did not independently associate the female sex with inferior survival. In a younger population, a survival benefit was observed after revascularization with MAG, to the point where survival did not differ between sexes. MAG was associated with a 25% mortality reduction.

Conclusion
Women receive fewer arterial grafts and anastomoses as opposed to men. In a younger patient population, the survival difference between sexes disappears when patients are treated with MAG.

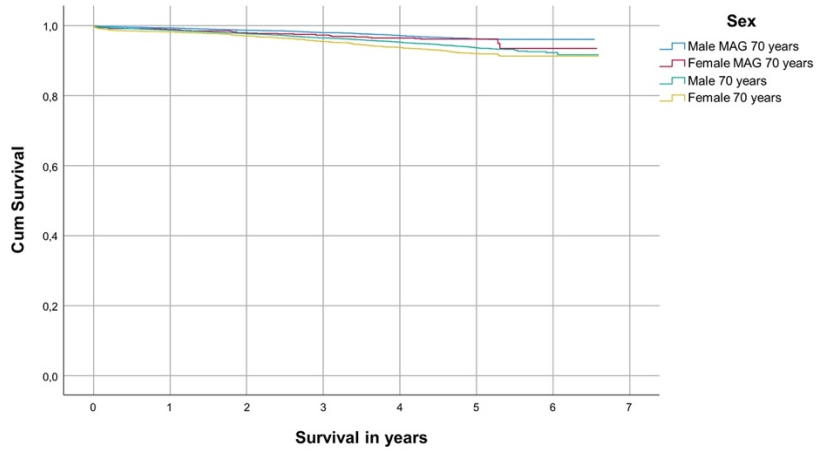

Figure 1. Kaplan Meier curve for survival in years of men and women aged 70 years and younger, for both the entire population and after multiple arterial grafting (MAG).

Abstract

09.30 uur

BIOCOMPATIBILITY OF A NOVEL LUNG SEALANT BASED ON FUNCTIONALIZED POLYOXAZOLINES IN AN OVINE MODEL OF PARENCHYMAL LUNG INJURY

Bob P. Hermans[a], Shoko Vos[b], Wilson W.L. Li[a], Erik H.F.M. van der Heijden[c], Harry van Goor[d], Ad F.T.M. Verhagen[a], Richard P.G. ten Broek[d]

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[b]Radboud university medical center, Radboud Institute for Health Sciences, Department of Pathology, Nijmegen, The Netherlands.
[c]Radboud university medical center, Radboud Institute for Health Sciences, Department of Pulmonology, Nijmegen, The Netherlands.
[d]Radboud university medical center, Radboud Institute for Health Sciences, Department of General surgery, Nijmegen, The Netherlands.

Objectives
Investigate the biocompatibility of a novel lung sealant (gelatin patch impregnated with functionalized polyoxazolines, NHS-POx), in terms of inflammation, wound healing and biodegradation.

Methods
Three lesions are made on the right lung of adult female sheep. Study groups (NHS-POx, fibrin patch [TachoSil®] and untreated control) were randomly allocated. Blinded histological assessment was performed at 5, 14 and 42 days (n=4 animals/term), using semi-quantitative scales (0-4) based on immune cells (polymorphonuclear cells, lymphocytes, plasma cells, macrophages, giant cells, necrosis) and biomaterial response (fibrosis, neovascularization, fatty infiltrate). Because a labeling mistake was suspected, original and adapted datasets were obtained (6 weeks) for post-hoc analysis.

Results
NHS-POx had significantly elevated immune response scores at five days compared to control (11.5 vs 7, p=0.005), as did the fibrin patch at two weeks (14 vs 7, p=0.022). By six weeks, cell response equalized among groups (p=0.22). However, one case of granulomatous inflammation to residual patch was noted in both a fibrin patch and a probable fibrin patch (labeling error). Healing, fibrosis and neovascularization were consistent across groups, showing localized pleural thickening. The NHS-POx patch displayed mesothelial coverage after two weeks, and full degradation both macro- and microscopically at six weeks, with the patch material substituted by extracellular matrix (adapted data).

Conclusion
The biocompatibility profile of NHS-POx seems comparable to favorable compared to the clinically frequently used fibrin patch. Rapid biodegradation and absent chronic inflammation or foreign body reaction may improve tissue regeneration, indicating promise for clinical use.

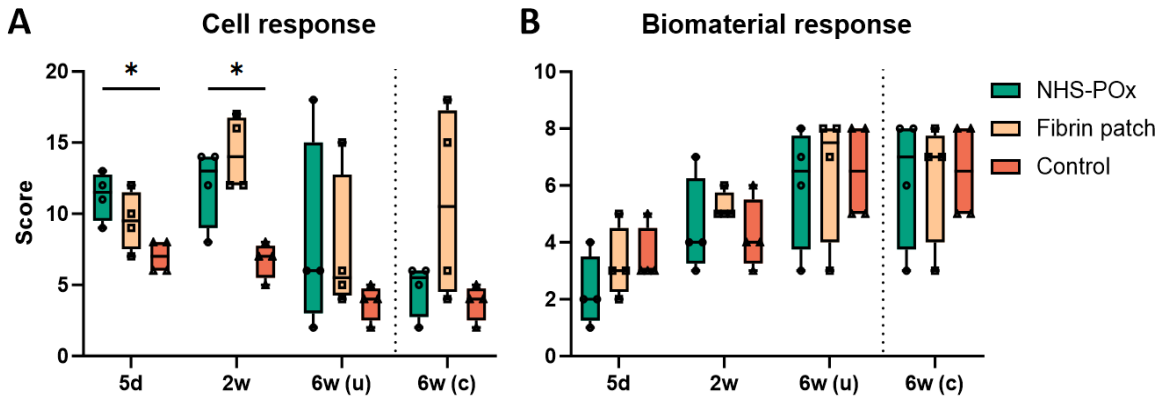


Figure 2A) Total cell response score (sum of semiquantitative scores [0-4] on polymorphonuclear cells, lymphocytes, plasma cells, macrophages, giant cells, necrosis, max 24 points). **B)** Total biomaterial response score (sum of semiquantitative scores [0-4] on neovascularization, fibrosis, fatty infiltrate, max 12 points).

*p<0.05. d = day; w = week; o = original data; a = adapted data.

Abstract

09.45 uur

HEART TRANSPLANTATION FOLLOWING HEART DONATION AFTER EUTHANASIA: A VALUABLE SUBSET OF THE DONATION AFTER CIRCULATORY DEATH DONOR POOL

Vincent van Suylen[1], Kevin Damman[2], Olivier Manintveld[3], Niels P. van der Kaaij[4], Michiel E. Erasmus[1]

[1] Department of Cardiothoracic Surgery, University Medical Center Groningen
[2] Department of Cardiology, University Medical Center Groningen
[3] Department of Cardiology, Erasmus Medical Center Rotterdam
[4] Department of Cardiothoracic Surgery, University Medical Center Utrecht

Objectives
Heart transplantations (HTx) have been performed with hearts donated after circulatory death (DCD) in the Netherlands since 2021. Most of these DCD donors decease after switch off of life support, and are categorized as DCD-III donors which is internationally considered the "standard" DCD donor. However, the Dutch donor pool consists of an additional pool: donation after euthanasia (DCD-V). Here, we compare DCD-III and DCD-V HTx.

Methods
The data of DCD HTx performed at the UMCG in the period 1/3/2021–1/3/2024 were retrospectively collected. The DCD population was subdivided in the DCD-III and DCD-V cases. Both donor and recipient characteristics and postoperative outcome were compared.

Results
Eighteen DCD HTx were performed, of which 6 (33%) were DCD-V HTx. More female donors were present in the DCD-V population (83%, versus 25% in DCD-III, p=0.043). Ischemic times and preservation times were comparable. No significant differences were found in recipient characteristics. Numerically, the need for postoperative extracorporeal life support (ECLS) in DCD-III (5 cases, 42%) versus 0% in DCD-V (p=0.114) was striking. Postoperative left ventricular function was comparable. Survival between both groups (91,7% in DCD-III versus 100% in DCD-V) was similar (p=0.564).

Conclusion
We compared HTx following DCD-III versus DCD-V in a single center. Most importantly, DCD-V is a non-inferior part of the Dutch donor pool and offers a substantial number of additional heart transplantations. The postoperative need of ECLS should be studied more in depth in a bigger cohort. Future studies will incorporate an overview of the full Dutch landscape.

Pitch

10.00 – 10.30 uur

THORACOSCOPIC-ASSISTED, MINIMALLY INVASIVE VERSUS CONVENTIONAL, OFF-PUMP BYPASS GRAFTING FOR SINGLE VESSEL CORONARY ARTERY DISEASE – A PROPENSITY SCORE MATCHED ANALYSIS

Fleur Sampon[1], Joost Ter Woorst[1], Lukas Dekker[2,3], Ferdi Akca[1]

[1]Department of Cardiothoracic Surgery, Catharina Hospital, Eindhoven, the Netherlands.
[2]Department of Cardiology, Catharina Hospital, Eindhoven, the Netherlands.
[3]Departments of Biomedical Technology, Eindhoven University of Technology, the Netherlands.

Objective
This study compared perioperative outcomes after off-pump revascularization through a thoracoscopic-assisted (non-robotic) minimally invasive approach (Endo-CAB) or sternotomy approach (OPCAB) for patients with single vessel left anterior descending (LAD) disease.

Methods
In this retrospective, propensity matched cohort study, 266 consecutive patients were included in the Endo-CAB group (n=136) and OPCAB group (n=130). After propensity score matching 116 Endo-CAB and 116 OPCAB patients were compared. 'Textbook outcome' was defined as the absence of 30-day mortality, re-exploration for bleeding, postoperative ischemia, cardiac tamponade, cerebrovascular events, wound infection, new-onset arrhythmias, pneumonia, placement of chest drains and prolonged hospital stay (> 7 days). Multivariable regression analysis was performed to identify independent predictors for textbook outcome.

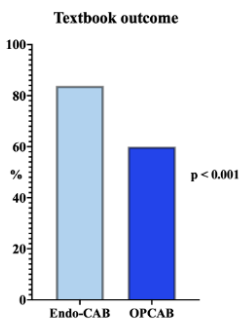
Results
Textbook outcome occurred significantly more frequent in the Endo-CAB group compared to the OPCAB group (81.9% vs. 59.5%, $p<0.001$). Patients undergoing Endo-CAB surgery had shorter hospital admission (3.0 [3.0 – 4.0] vs. 5.0 [4.0 – 6.0] days, $p<0.001$), less blood loss (225 [150 – 355] vs. 450 [350 – 600] ml, $p<0.001$). Other perioperative outcomes were comparable for both groups. Regression analysis demonstrated that Endo-CAB approach was an independent positive predictor for textbook outcome (OR 3.02, 95% CI 1.61-5.66, $p<0.001$).

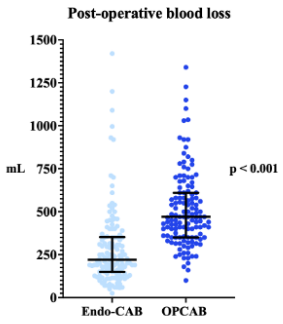
Conclusions
Our study suggests that patients undergoing Endo-CAB surgery have improved perioperative outcome resulting in higher rates of textbook outcome for the treatment of single vessel CAD. This technique could be widely available since routine thoracoscopic instruments are used.

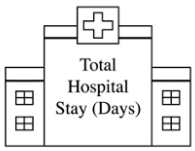
Endo-CAB vs. OPCAB 30-day outcome

Summary

Background: This study compared perioperative outcomes of a thorascopic-assisted (non-robotic) minimally invasive approach (Endo-CAB) or sternotomy approach (OPCAB) for single vessel LAD disease.
Methods: Retrospective propensity matched cohort study including 132 patients after matching (116 Endo-CAB, 116 OPCAB). The primary objective was comparison of Textbook outcome, defined as the absence of 30-day mortality, re-exploration for bleeding, postoperative ischemia, cardiac tamponade, cerebrovascular events, wound infection, new-onset arrhythmias, pneumonia, placement of chest drains and prolonged hospital stay (>7 days).
Results: Textbook outcome occurred significantly more frequent in the Endo-CAB group compared to the OPCAB group (81.9% vs. 59.5%, p<0.001). Patients undergoing Endo-CAB surgery had shorter hospital admission (3.0 [3.0 – 4.0] vs. 5.0 [4.0 – 6.0] days, p<0.001), less blood loss (225 [150 – 355] vs. 450 [350 – 600] ml, p<0.001).
Conclusion: Patients undergoing Endo-CAB surgery have improved perioperative outcome resulting in higher rates of textbook outcome for the treatment of single vessel CAD.







Median [IQR]
3.0 [3.0-4.0] vs.
5.0 [4.0-6.0]
p<0.001

Pitch

10.00 – 10.30 uur

INCIDENCE AND PROGRESSION OF PERICARDIAL EFFUSION AFTER CARDIAC SURGERY ON ROUTINE ECHOCARDIOGRAPHY: A SYSTEMATIC REVIEW

S.R. van Dinter[1], L.W. Wollersheim[2], H. Dieker[3], R.H. Heijmen[1], W.W.L. Li[1], A.F.T.M. Verhagen[1]

[1] *Department of Cardiothoracic Surgery, Radboudumc, Nijmegen, The Netherlands*
[2] *Department of Cardiothoracic Surgery, Medical Center Leeuwarden, Leeuwarden, The Netherlands*
[3] *Department of Cardiology, Radboudumc, Nijmegen, The Netherlands*

Objectives
Postoperative pericardial effusion (PPE) after cardiac surgery occurs frequently. Reported incidence varies widely between 5-85%. Although often inconsequential, PPE can evolve into life-threatening cardiac tamponade (CT) requiring urgent reintervention. However, probability and risk factors of PPE leading to CT remain unclear. In this review, we summarized published data on incidence of PPE after cardiac surgery, its development into CT and the rate of reinterventions.

Methods
We performed a systematic search on PubMed, Embase and Web Of Science. Articles describing PPE after cardiac surgery with at least one routine echocardiogram were included.

Results
Twenty-six of 2693 articles were included, combining 8497 patients. Incidence of PPE was 47.7%, and in 1.6% PPE-related reinterventions were performed. Reinterventions were most frequent after aortic surgery (6.0%), and significantly less after valve (3.3%) and CABG surgery (1.2%, $p<0.001$). In 4083 patients size specification of PPE was documented. Large PPE (>14mm circumferential or >19mm loculated effusion) led to reintervention in 54.3% of cases, compared to 2.0% and 2.4% for small and moderate effusion (figure 1C). Of all reported reinterventions, 60% had symptomatology of CT, while 13% were performed in asymptomatic patients (of which 75% had large effusion). In 27% symptomatology was not reported.

Conclusions
PPE-related reinterventions are rare, but more common after aortic surgery and/or with large effusion. A considerable number of reinterventions were performed in asymptomatic patients or with unreported symptomatology, whereas half of large effusions were treated conservatively. Further research with routine echocardiography after cardiac surgery and elaborate description of symptomatology is warranted.

Figure 1 – The total incidence of PPE and reinterventions, the symptomatology in patients with reinterventions, and the rate of reintervention per effusion size

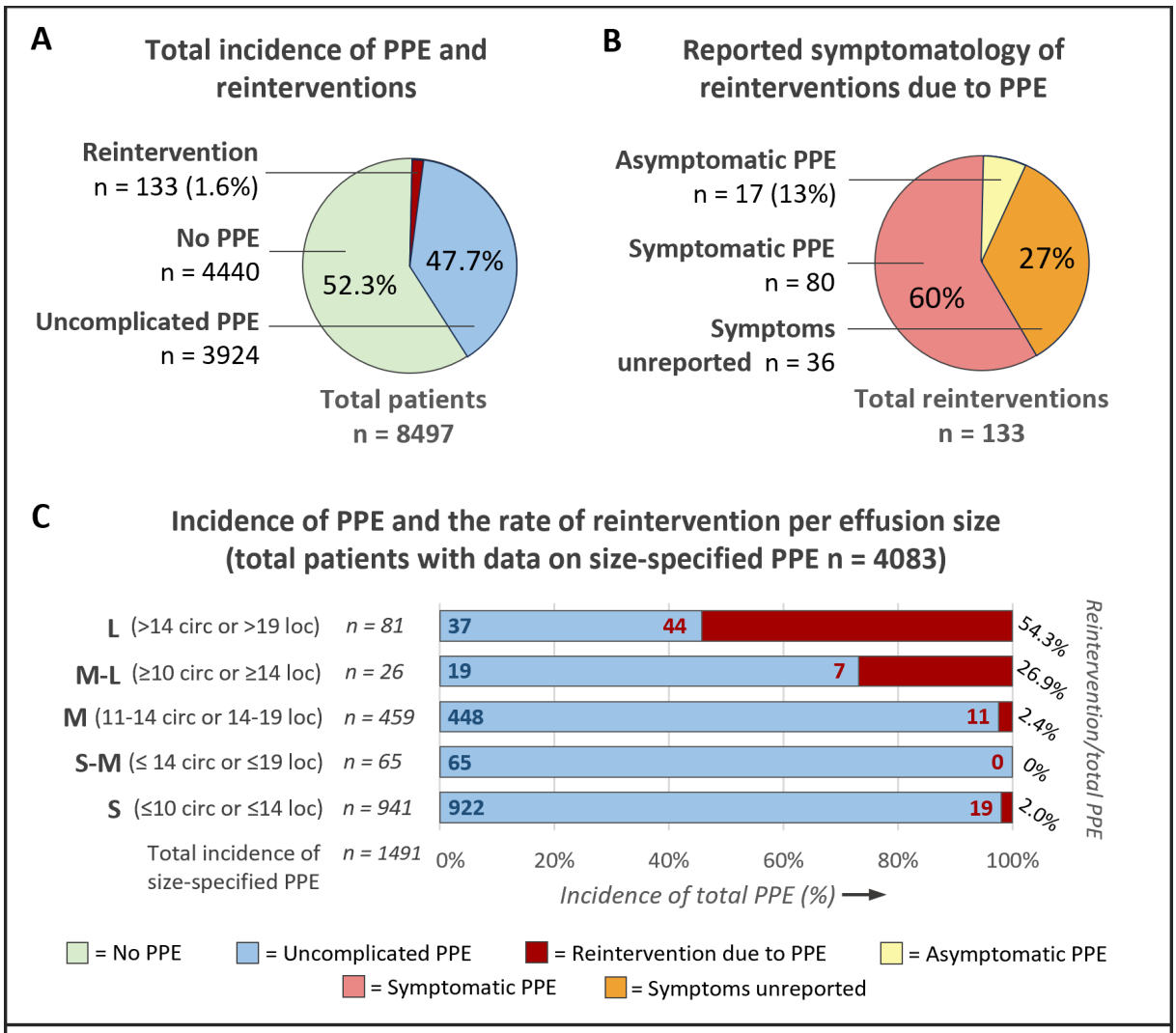


Figure 1. **A**: Pie chart showing the distribution of patients with uncomplicated PPE, reintervention due to PPE and absence of PPE, derived from all included studies. **B**: Pie chart showing the distribution of the reported symptomatology of patients that had a reintervention due to PPE. **C:** Bar chart showing the incidence of PPE per effusion size (small to large) if specified in study. Uncomplicated PPE is marked with blue, reinterventions with red. One study reported a combined incidence of small and moderate PPE (S-M), and two studies combined moderate and large PPE incidence (M-L). The ratios between the incidence of a reintervention and total PPE are shown on the right side of the bar chart.

CABG: coronary artery bypass grafting; Circ: circular; Loc: loculated; CT: cardiac tamponade; L: large; M: moderate; PPE: postoperative pericardial effusion; S: small

Pitch

10.00 – 10.30 uur

THE USE OF PLEDGET-REINFORCED SUTURES DURING SURGICAL AORTIC VALVE REPLACEMENT: A SYSTEMATIC REVIEW AND META ANALYSIS

J.W. Taco Boltje[1, 2], Mathijs T. Carvalho Mota[1], Michiel D. Vriesendorp[1,2], Alexander B.A. Vonk[1,2], Rolf H.H. Groenwold[3,4], Robert J.M. Klautz[1,2], Bart J.J. Velders[2,3]

[1] Department of Cardiothoracic Surgery, Amsterdam University Medical Center location AMC, Amsterdam;
[2] Department of Cardiothoracic Surgery, Leiden University Medical Center, Leiden;
[3] Department of Clinical Epidemiology, Leiden University Medical Center, Leiden;
[4] Department of Biomedical Data Science, Leiden University Medical Center, Leiden

Objective
Literature presents conflicting results on the pros and cons of pledget-reinforced sutures during surgical aortic valve replacement (SAVR). We aimed to investigate the effect of pledget-reinforced sutures versus sutures without pledgets during SAVR on different outcomes in a systematic review and meta-analysis.

Methods
A literature search was performed in PubMed, Cochrane and Embase databases. Studies must include patients undergoing SAVR and must compare any pledget-reinforced with any suturing technique without pledgets. The primary outcome was paravalvular leakage (PVL), and secondary outcomes comprised thromboembolism, endocarditis, mortality, mean pressure gradient (MPG) and effective orifice area (EOA). Results were pooled using a random-effects model as risk ratios (RRs) or mean differences (MDs) for which the no pledgets group served as reference.

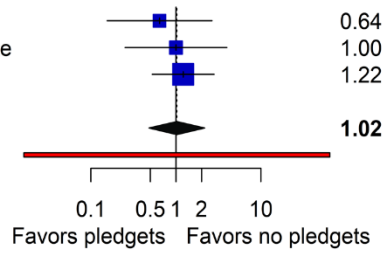
Results
Eight studies, all observational, met the inclusion criteria. The risk of bias was critical in six studies, and high and moderate in the other two. The pooled RR for moderate or greater PVL was 0.76 (95% confidence interval [CI] 0.14, 4.09). The pooled RR for mortality at 30-days was 1.02 (95% CI 0.54, 1.94). For MPG and EOA at 1-year follow-up, the pooled MDs were 0.60 mmHg (95% CI -4.92, 6.11) and -0.03 cm^2 (95% CI -0.18, 0.12), respectively.

Conclusions
Literature on the use of pledget-reinforced sutures during SAVR is at high risk of bias. Pooled results are inconclusive regarding superiority of either pledget-reinforced sutures or sutures without pledgets. to support or oppose the use of pledget-reinforced sutures.

A. 30-day Mortality after surgical aortic valve replacement.

Study	Pledgets Events	Pledgets Total	No Pledgets Events	No Pledgets Total	RoB	RR	95%-CI	Weight
Kim et al.	3	212	5	227	Critical	0.64	[0.16; 2.66]	20.3%
Velders et al.	4	397	4	397	Moderate	1.00	[0.25; 3.97]	21.5%
LaPar et al.	9	291	13	511	Critical	1.22	[0.53; 2.81]	58.2%
Random effects model		**900**		**1135**		**1.02**	**[0.48; 2.18]**	**100.0%**
Prediction interval							**[0.02; 64.56]**	

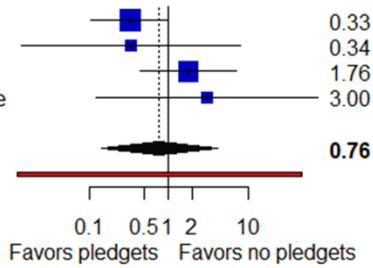
Heterogeneity: I^2 = 0%, τ^2 = 0



B. Major Paravalvular Leak during mid-term Follow-up.

Study	Pledgets Events	Pledgets Total	No Pledgets Events	No Pledgets Total	RoB	RR	95%-CI	Weight
Englberger et al.	6	414	6	135	Critical	0.33	[0.11; 0.99]	42.0%
Ugur et al.	1	289	0	32	Critical	0.34	[0.01; 8.10]	11.5%
LaPar et al.	4	291	4	511	Critical	1.76	[0.44; 6.97]	35.1%
Velders et al.	1	397	0	397	Moderate	3.00	[0.12; 73.42]	11.4%
Random effects model		**1391**		**1075**		**0.76**	**[0.14; 4.09]**	**100.0%**
Prediction interval							**[0.01; 46.20]**	

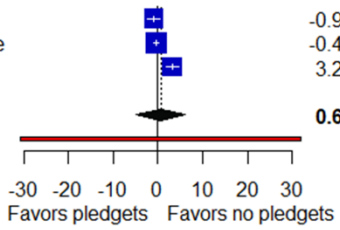
Heterogeneity: I^2 = 33%, τ^2 = 0.5455



C. Mean Pressure Gradient (mmHg) at 1-year Follow-up.

Study	Pledgets Total	Pledgets Mean	Pledgets SD	No Pledgets Total	No Pledgets Mean	No Pledgets SD	RoB	MD	95%-CI	Weight
Ugur et al.	289	8.98	3.96	32	9.90	4.00	Critical	-0.92	[-2.38; 0.54]	32.2%
Velders et al.	397	12.40	4.50	397	12.80	4.50	Moderate	-0.40	[-1.03; 0.23]	35.5%
Lee et al.	136	14.10	5.40	79	10.90	5.10	Critical	3.20	[1.75; 4.65]	32.3%
Random effects model	**822**			**508**				**0.60**	**[-4.92; 6.11]**	**100.0%**
Prediction interval									**[-30.64; 31.83]**	

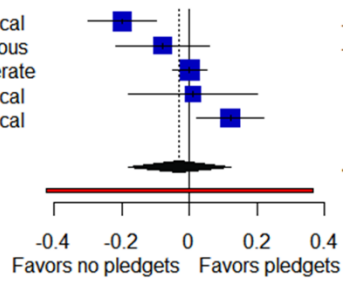
Heterogeneity: I^2 = 91%, τ^2 = 4.4354



D. Effective Orifice Area (cm^2) at 1-year Follow-up.

Study	Pledgets Total	Pledgets Mean	Pledgets SD	No Pledgets Total	No Pledgets Mean	No Pledgets SD	RoB	MD	95%-CI	Weight
Lee et al.	136	1.40	0.30	79	1.60	0.40	Critical	-0.20	[-0.30; -0.10]	21.2%
Tabata et al.	50	1.36	0.45	102	1.44	0.32	Serious	-0.08	[-0.22; 0.06]	18.3%
Velders et al.	397	1.49	0.36	397	1.49	0.36	Moderate	0.00	[-0.05; 0.05]	24.6%
Kim et al.	212	1.74	1.38	227	1.73	0.38	Critical	0.01	[-0.18; 0.20]	14.5%
Ugur et al.	289	1.52	0.30	32	1.40	0.27	Critical	0.12	[0.02; 0.22]	21.4%
Random effects model	**1084**			**837**				**-0.03**	**[-0.18; 0.12]**	**100.0%**
Prediction interval									**[-0.42; 0.36]**	

Heterogeneity: I^2 = 81%, τ^2 = 0.0122



Pitch

10.00 – 10.30 uur

HEMODYNAMIC STRUCTURAL VALVE DETERIORATION AFTER BIOPROSTHETIC AORTIC VALVE REPLACEMENT: IT COMES AND GOES

Bart J.J. Velders[1,2], Michiel D. Vriesendorp[1], Federico M. Asch[3], Michael J. Reardon[4], Francois Dagenais[5], Michael G. Moront[6], Joseph F. Sabik III[7], Rolf H.H. Groenwold[2,8], Robert J.M. Klautz[1]

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[6] Cardiothoracic Surgery, ProMedica Toledo Hospital, Toledo, OH, USA
[7] Surgery, University Hospitals Cleveland Medical Center and Case Western Reserve University School of Medicine, Cleveland, OH, USA
[8] Department of Biomedical Data Science, Leiden University Medical Center, Leiden, The Netherlands

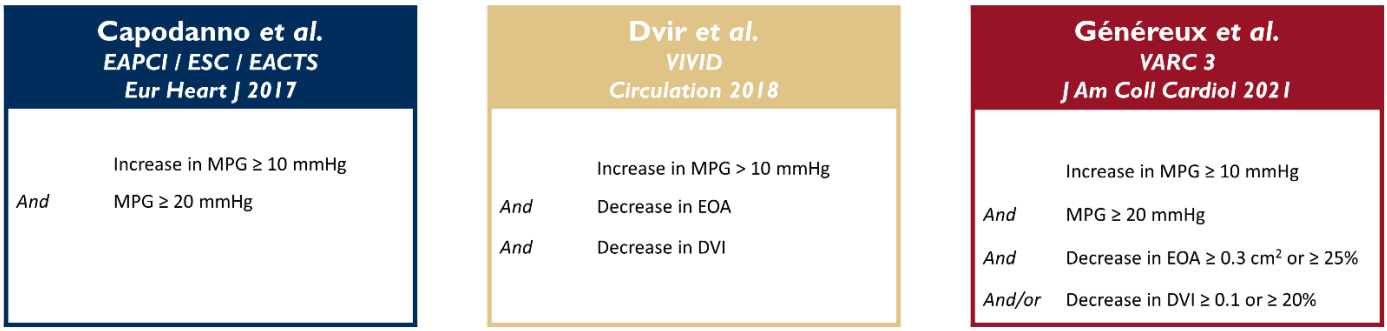
Objective
New echocardiographic definitions have been proposed for hemodynamic structural valve deterioration (SVD), mainly based on worsened hemodynamics as compared to the discharge echo (*Figure 1*). We aimed to study their consistency in classifying SVD after surgical aortic valve replacement (SAVR).

Methods
Data were used of SAVR patients implanted in a multicenter, prospective cohort study with 5-year follow-up. Serial echocardiographic parameters were assessed by an independent core laboratory. Moderate or greater stenotic hemodynamic SVD was defined according to Capodanno *et al.*, Dvir *et al.*, and the Valve Academic Research Consortium (VARC) 3; regurgitation data was not considered in this analysis. Their consistency was evaluated by calculating how many patients that were classified with SVD at one timepoint were also classified with SVD at the subsequent timepoint.

Results
A total of 1118 patients were implanted. The mean age was 70 years and 75% were male. Hemodynamic SVD at any visit was present in 51 (4.6%), 32 (2.9%), and 34 (3.0%) patients according to Capodanno, Dvir, and VARC-3. 1064 (95%) patients were never labelled with SVD by any definition. After the first classification with SVD, 59%, 59%, and 65% had no subsequent SVD classification according to Capodanno, Dvir, and VARC-3, respectively.

Conclusions
The current definitions of hemodynamic SVD are inconsistent discriminators for the detection of stenotic hemodynamic SVD. While the diagnosis of SVD may be categorical, echocardiographic indices lack this degree of precision in the first 5-years after SAVR. The observed inconsistencies challenges the clinical usefulness of these definitions.

Figure 1. Contemporary definitions of moderate or greater stenotic hemodynamic structural valve deterioration after aortic valve replacement.



Increase or decrease are determined using the echocardiogram at discharge as reference.
DVI, Doppler velocity index; EACTS, European Association for Cardio-Thoracic Surgery; EAPCI, European Association of Percutaneous Cardiovascular Interventions; EOA, effective orifice area; ESC, European Society of Cardiology; MPG; mean pressure gradient; VARC, Valve Academic Research Consortium; VIVID, Valve-in-Valve International Data.

Abstract

11.15 uur

ATRIAL ELECTROPHYSIOLOGICAL PROPERTIES OF NORMOTHERMIC-PERFUSED HEARTS DONATED AFTER CIRCULATORY DEATH

Mark F.A. Bierhuizen; Hongxian Xiang; Mathijs van Schie; Jorik H. Amesz; Sanne J.J. Langmuur; Paul Knops; Olivier C. Manintveld; Jolanda Kluin; Yannick J.H.J. Taverne; Natasja M.S. de Groot

Erasmus Medical Center, Rotterdam

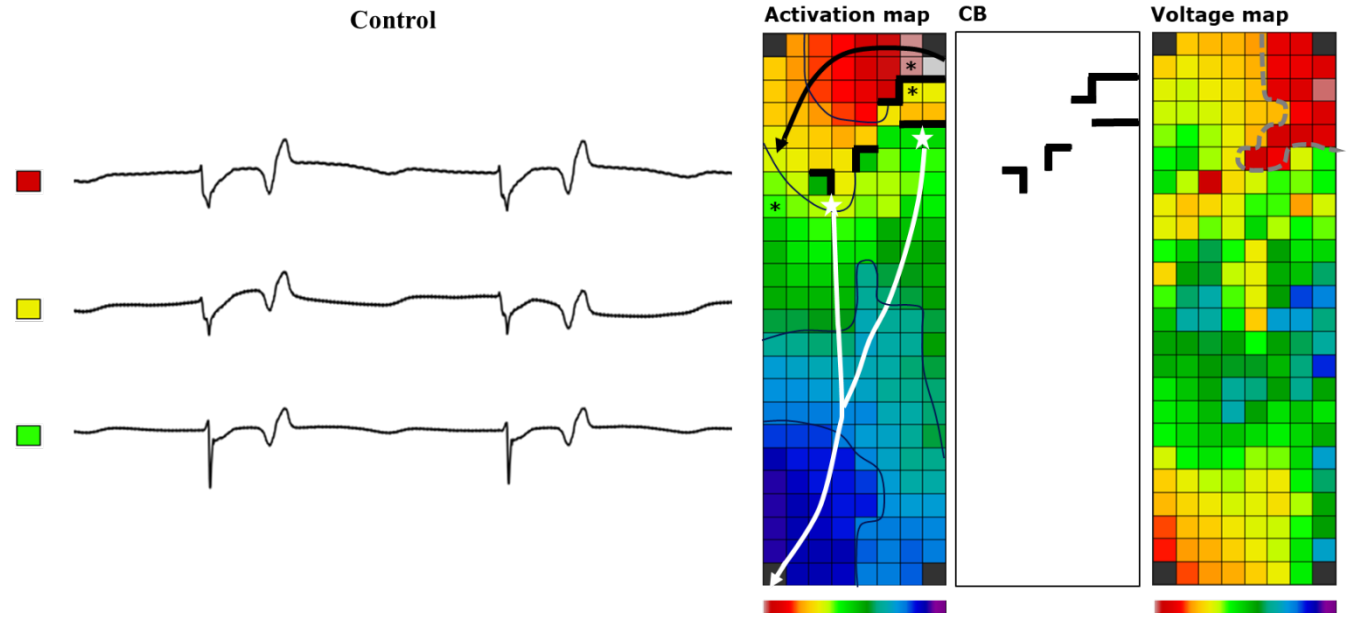
Objectives
Donation after circulatory death (DCD) hearts undergo a period of ischemia during transplantation. Atrial ischemia is considered an important contributor to the development of atrial electrophysiological abnormalities. The objective was to characterize atrial electrophysiological properties of DCD hearts during ex-situ heart perfusion (ESHP).

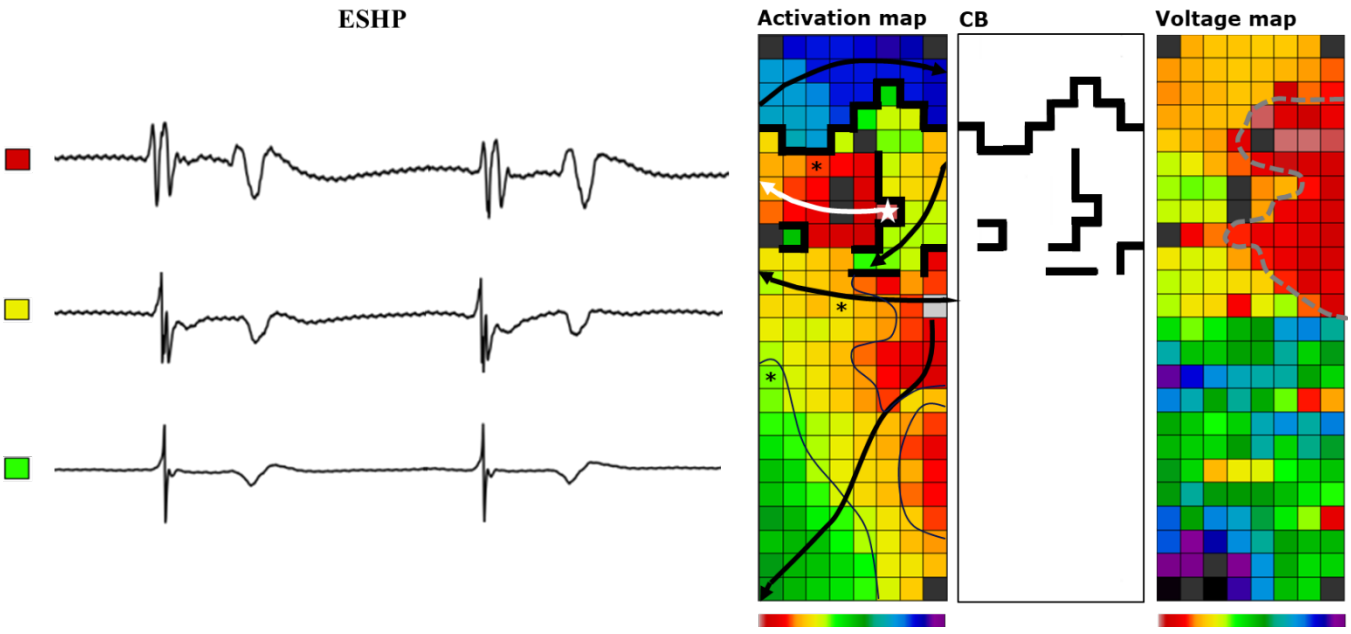
Methods
High-resolution epicardial mapping was performed in 10 human DCD hearts during ESHP and compared to 10 control patients undergoing intra-operative mapping during bypass surgery. Unipolar potential voltages, fractionation, conduction velocity (CV) and conduction block (CB) were quantified in the right atrium (RA) and left atrium (LA). The occurrence of post-transplantation atrial fibrillation (AF), flutter (AFL) and sinus node dysfunction (SND) were evaluated.

Results
In DCD hearts, unipolar potential voltages (2.8[2.4 – 3.0] vs. 5.3[3.9 – 6.1] mV, p=0.002) and CV (74.2[71.4 – 78.8] vs. 91.7[89.2 – 96.3] m/s, p<0.001) were lower at the RA compared to the control group. A larger proportion of CB was observed in the RA (8.4[5.1 – 10.5] vs. 2.4[1.0 – 3.2] %, p=0.002) and LA (7.9[5.3 – 11.3] vs. 0.5[0.1 – 1.1] %, p<0.001) of DCD hearts. Single potentials were less frequently recorded in the RA (70.4[57.2 – 77.4] vs. 85.2[80.1 – 89.6] %, p=0.003) and LA (50.9[33.8 – 65.7] vs. 80.7[69.5 – 90.7] %, p=0.011). Two patients who developed early post-transplantation SND had areas of CB surrounding the SAN (18.1 vs 5.5 %, p = 0.286).

Conclusion
During ESHP, the atria of DCD hearts are characterized by abnormal electrical signal morphologies and patterns of activation. Future studies will have to demonstrate that a higher degree of CB is predictive for SND.

Figure 2: Typical epicardial unipolar electrograms of the RA of a patient in the control group and a DCD heart during ESHP, showing more fractionated potentials, more CB and lower voltages. The right panel shows the corresponding activation map, CB and voltage maps of these recordings. * represent the illustrated electrograms in the left panel; Wave-front direction is illustrated by the black and white arrows; Isochronal lines are illustrated by thin black lines and CB by thick black lines; LVAs are highlighted by the grey dotted line. CB: conduction block; LVA: low voltage areas.





Abstract

11.30 uur

ADVANCED ORGAN PROTECTION IN AORTIC ARCH SURGERY: BEATING HEART SURGERY WITHOUT CIRCULATORY ARREST

Jamie Romeo[1], Erik P J Körver[1], Sophie van de Walle[1,2], Rik Hendrix[1], Arne Doddema[1], Shokoufeh Cheheili Sobbi[1], Rik Schreurs[1], Werner Mess[3], Leon Schurgers[4], Koen Reesink[4], Ehsan Natour[1], Jos Maessen[1,2], Roberto Lorusso[1,2], Michael Jacobs[5], Elham Bidar[1,2]

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[2] *Cardiovascular Research Institute (CARIM), Maastricht University, Maastricht, the Netherlands*
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[5] *Department of Vascular Surgery, Maastricht UMC+, Maastricht, The Netherlands*

Objectives
Deep hypothermic circulatory arrest, antegrade brain perfusion and cardioplegic arrest are commonly used organ protection techniques in aortic arch surgery. However, mortality and morbidity remain high in patients with advanced cardiovascular disease. Here we describe our experience with continuous organ perfusion during aortic arch surgery.

Methods
Cardiopulmonary bypass access was achieved through axillary artery for continuous cerebral perfusion under bilateral TCD and EEG monitoring and femoral cannulation (EndoReturn with a Coda® balloon) for visceral perfusion. Cardiac perfusion was reinitiated with warm blood after root surgery (MYOtherm XP®). Systemic cooling was applied between 28-32 degrees.

Results
From June 2022 to February 2024, 20 elective patients underwent aortic arch surgery using continuous organ perfusion (Table 1). Fourteen were operated for chronic Type A or B dissection, and 6 for arch aneurysm. Five were redo procedures. Circulatory arrest was avoided in 12 patients, resulting in maximum perioperative lactate between 1.0-3.0 mmol/L. In the other 8 patients, median arrest time was 35 min [range 7-69], and maximum perioperative lactate ranged between 2.0-5.1mmol/L. Cardioplegic arrest was avoided in 3 patients and limited to a median of 90 minutes [28-168] in those requiring root surgery. Median intensive care stay was 1 day [range 1-9 days], median ventilation time 9 hours [3-150]. One patient had a transient ischemic attack, and all patients survived until hospital discharge after a median of 8 days [range 4-30].

Conclusion
Beating heart aortic arch surgery, while avoiding deep hypothermic circulatory arrest, is feasible, and could allow less mortality and faster recovery.

#	Gender/ age(y)	Co-morbid	Extent surgery	Min Temp. (C)	Cardiac arrest (min)	Circulatory arrest (min)	CPB time (min)	Maximum perioperative lactate <24 hour	Ventilation time (h)	Postoperative complications	ICU (days)	Discharge from Hospital (days)
1	M/65	TBAD, LVEF 20%	B + FET	28	105	25	300	5.1	120	SIRS	5	16
2	F/73	cTAAD, Stroke, hemiparesis	SCAR + Arch Z1 + debr. ABC	30	100	0	285	1.8	8	None	1	5
3	F/64	TBAD COPD, BMI 20	SCAR + Arch Z2 + debr. ABC + CCS	30	60	0	160	1.3	4	None	1	7
4	M/51	cTAAD, LVEF 30%	FET	26	71	51	230	4.7	10	CCS revision	1	5
5	F/54	cTAAD, SCAR	Re-do FET	26	98	69	260	4.5	12	None	1	8
6	M/30	Marfan, cTAAD, Bentall, RVEF 10%	Re-do FET	30	0	54	247	2.1	10	Pneumonia	1	30
7	M/44	cTAAD LVEF 30%	B + FET	28	90	25	285	2.0	30	SIRS	5	11
8	M/71	TBAD, LVEF 30%	AVR + Arch Z2, debr. ABC + CCS	32	80	0	216	1.3	9	None	1	4
9	M/76	TIA, aneurysm	SCAR + Arch Z2, debr. ABC + CCS	30	100	0	230	1.3	15	None	1	6
10	F/28	cTAAD, BMI 55 LVEF 35%	B + FET	26	90	44	350	4.7	8	Pneumonia	4	10
11	F/74	COPD, BMI 20 LVEF 35%, aneurysm	SCAR + Arch Z2, debr. ABC + CCS	32	35	0	170	1.0	3	None	1	7
12	M/65	Mycotic arch aneurysm, SCC	SCAR + NCS + FET	30	52	0	275	1.5	8	Tamponade, UTI, AB treatment	2	30

13	M/62	cTAAD, AVR, redo-SCAR, endocarditis	3rd Redo AVR + posterior enlargement+ Hemiarch	34	168	0	263	1.9	14	Delirium	7	10
14	M/65	cTAAD , SCAR Hemiarch	Re-do FET	28	40	26	227	2.5	9	None	1	6
15	F/78	BMI 19, Colitis, COPD, asc + arch aneurysm	AVR + Arch Z3, debr. ABC, CCS, LSA	30	51	0	221	3.0	9	Covid pneumonia	5	15
16	M/60	cTAAD, B + Hemiarch	Re-do FET	28	0	0	216	1.3	8	None	1	8
17	M/62	BMI 41, porcelain aorta, COPD, arch aneurysm	B + arch Z1, debr. ABC	32	120	0	312	3.0	150	Pneumonia, sternal dehiscence	9	21
18	M/69	Root + arch aneurysm	AVR + NCS + Arch Z1 + debr. ABC	34	100	0	169	1.8	6	None	1	5
19	V/74	IMH ascendens, TBAD	SCAR + Arch Z2 + debr. ABC + CCS	30	28	0	246	0.8	3	None	3	10
20	M/73	TBAD	SCAR + FET	28	0	7	208	1.4	27	Transient ischemic attack,	2	7

F= Female; M= Male; y= years; C= Celsius; surg.= surgery; min= minutes; h= hours; d= days; CA= circulatory arrest time; vent= ventilation time after surgery at the ICU; temp= temperature; Re-do= reoperation; ICU= intensive care unit; B= Bentall; FET= Frozen elephant trunk; SIRS= systemic inflammatory response syndrome; TBAD= Type B aortic dissection; cTAAD= chronic type A aortic dissection; LVEF= left ventricular ejection fraction; BMI= body mass index; NCS= non coronary sinus; AVR= aortic valve replacement; SCAR= supracoronary aortic replacement; COPD= chronic obstructive pulmonary disease; Debr.= debranching; ABC= Bracheocephalic artery; CCS= left carotid artery; LSA= left subclavian artery; FEM = femoral artery

Abstract

11.45 uur

PERCUTANEOUS CORONARY INTERVENTION WITH DRUG-ELUTING STENTS VERSUS CORONARY BYPASS SURGERY FOR COMPLEX CORONARY ARTERY DISEASE: A BAYESIAN ANALYSIS OF RANDOMIZED TRIALS

Michal J. Kawczynski, MD[1,2], Andrea Gabrio, PhD[3], Jos G. Maessen, MD, PhD[1,2], Arnoud W.J. van 't Hof, MD, PhD[2,4,5], James M. Brophy, MD, PhD[5], Can Gollmann-Tepeköylü, MD, PhD[7], Peyman Sardari Nia, MD, PhD[1,2], Pieter A. Vriesendorp, MD, PhD[2,4], and Samuel Heuts, MD, PhD[1,2,*]

[*] *Presenter;* [1] *Department of Cardiothoracic Surgery, Maastricht University Medical Center (MUMC+), Maastricht, the Netherlands;* [2] *Cardiovascular Research Institute Maastricht (CARIM), Maastricht University, Maastricht, the Netherlands;* [3] *Department of Methodology and Statistics, University Maastricht, Maastricht, the Netherlands;* [4] *Department of Cardiology, Maastricht University Medical Center (MUMC+), Maastricht, the Netherlands;* [5] *Department of Cardiology, Zuyderland Medisch Centrum, Heerlen, the Netherlands;* [6] *McGill University Health Center, Center for Health Outcome Research (CORE), Montreal, Quebec, Canada;* [7] *Department of Cardiac Surgery, Medical University of Innsbruck, Innsbruck, Austria*

Objectives
We aimed to assess the totality of randomized evidence comparing percutaneous coronary interventions with drug-eluting stents (DES-PCI) to coronary artery bypass grafting (CABG) for complex coronary artery disease (CAD), under the Bayesian statistical framework*****.

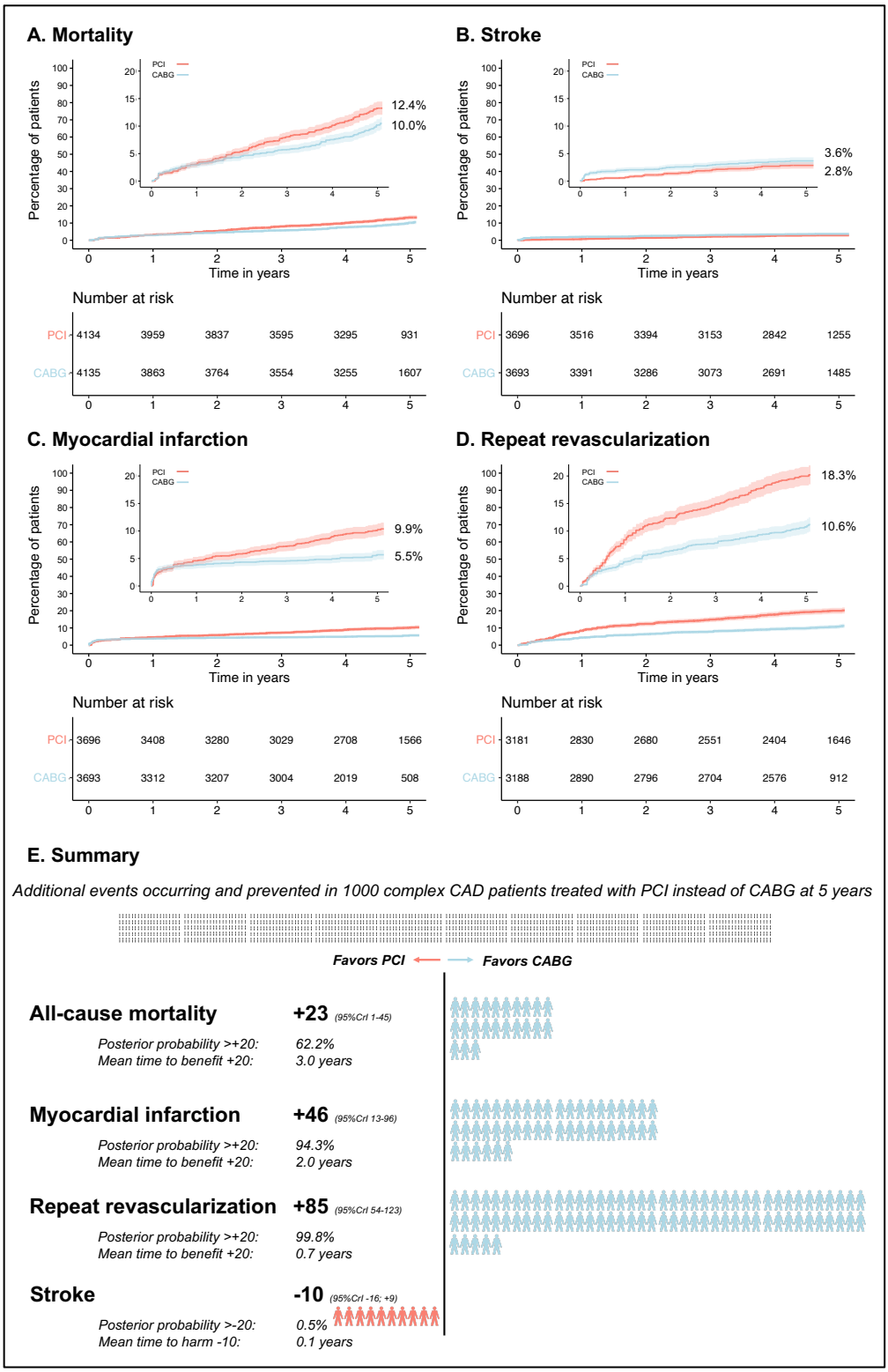
Methods
A Bayesian re-analysis of trials comparing DES-PCI to CABG with 5-year follow-up was performed. The primary outcome was all-cause mortality at five years; secondary outcomes were stroke, myocardial infarction, and repeat revascularization. Endpoints were reported in relative risks (RR) and absolute risk differences (ARD), with 95% credible intervals (CrI). Kaplan-Meier curves were used to reconstruct individual patient data. This study was registered in PROSPERO (CRD42024512897, date: February 25th 2024).

Results
Six studies (SYNTAX, NOBLE, EXCEL, PRECOMBAT, BEST, FREEDOM) comprising 8269 patients (DES-PCI n=4134, CABG n=4135) were re-analyzed using Bayesian statistics. All-cause mortality at 5 years was increased with PCI (median RR 1.23 (95%CrI 1.01-1.45), with a median ARD of +2.3% (95%CrI 0.1-4.5%). For stroke, MI, and repeat revascularization, the median RRs were 0.79 (95%CrI 0.54-1.25), 1.84 (95%CrI 1.23-2.75), and 1.80 (95%CrI 1.51-2.16) for PCI, respectively (**Figure 1A-D**). Illustratively, in a sample of 1000 patients undergoing DES-PCI instead of CABG for complex CAD, a median of 23 additional deaths, 46 myocardial infarctions and 85 repeat revascularizations occurred at five years, while 10 strokes were prevented (**Figure 1E**).

Conclusion
In complex CAD, CABG provides a clinically relevant benefit over DES PCI at five years. These findings offer an intuitive interpretation of revascularization outcomes in complex CAD, and may guide the heart-team and the shared decision-making process.

* When accepted for a potential presentation during the meeting, the concept of Bayesian statistical analysis will be presented to the audience as well, making them more familiar with this innovative statistical concept.

FIGURE 1. Graphical summary of the findings of this Bayesian re-analysis of randomized trials comparing DES-PCI to CABG for complex CAD.



CAD: coronary artery disease, PCI: percutaneous coronary intervention.

Abstract

12.00 uur

SURVIVAL AFTER SURGERY FOR TYPE-A AORTIC DISSECTION: A CONTEMPORARY DUTCH NATIONWIDE REGISTRY STUDY

Bart J.J. Velders[1,2], Patrick T. Timmermans[1], Maaike M. Roefs[3], Rolf H.H. Groenwold[2,4], Roemer Vos[1], Jerry Braun[1], Robert J.M. Klautz[1], Gianclaudio Mecozzi[5*], Jesper Hjortnaes[1*]
On behalf of the Cardiothoracic Surgery Registration Committee and the Aortic Surgery Work Group of the Netherlands Heart Registration

[1] Department of Cardiothoracic Surgery, Leiden University Medical Center, Leiden, The Netherlands
[2] Department of Clinical Epidemiology, Leiden University Medical Center, Leiden, The Netherlands
[3] Netherlands Heart Registration, Utrecht, The Netherlands
[4] Department of Biomedical Data Science, Leiden University Medical Center, Leiden, The Netherlands
[5] Department of Cardiothoracic Surgery, University Medical Center Groningen, University of Groningen, Groningen, The Netherlands
**equal contribution*

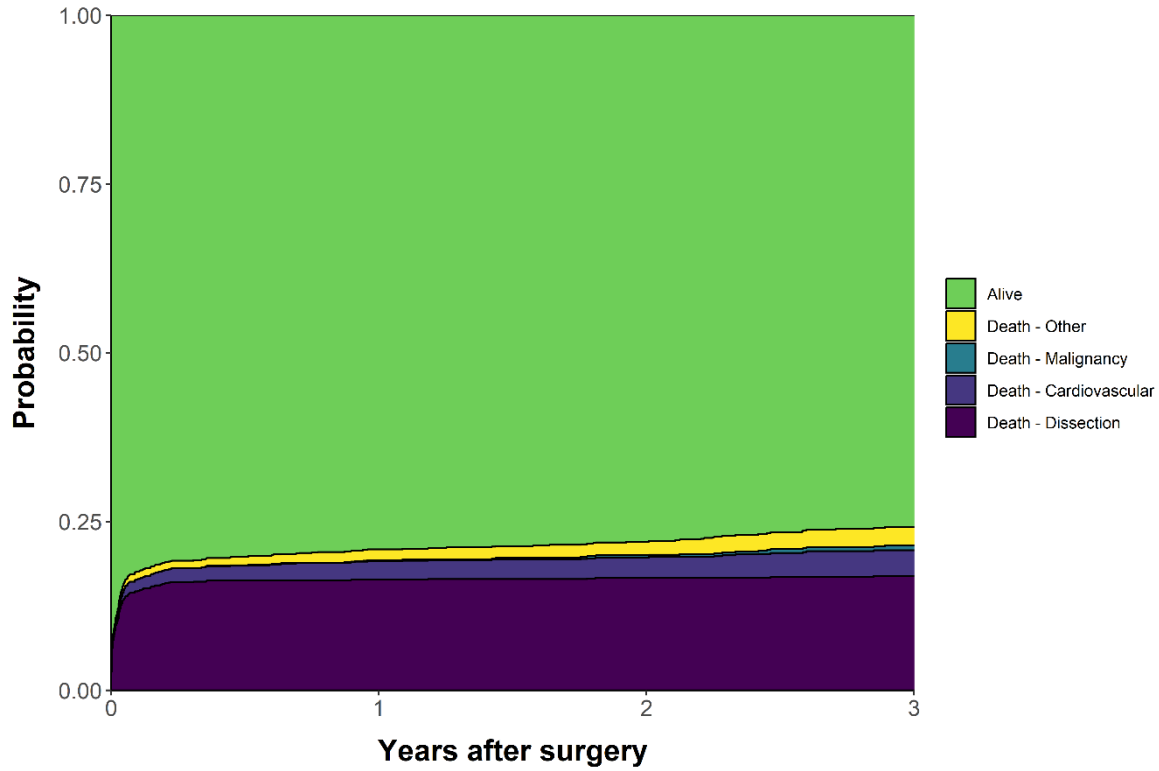
Objectives
To describe contemporary survival outcomes after surgery for type-A aortic dissection in The Netherlands.

Methods
All patients who underwent surgery for type-A aortic dissection in The Netherlands between 2018 and 2021 were identified in the Netherlands Heart Registration (NHR). NHR data were linked to data about (cause of) death from Statistics Netherlands. Time trends for in-hospital mortality were analysed, and age- and sex-adjusted mortality odds ratios were compared across years. The occurrence of death over time was graphically illustrated, stratified by cause of death.

Results
The study population consisted of 1317 patients, of whom 318 died during a median follow-up of 2.3 years. The average age was 63 years and 59% was male. The extent of surgery included the aortic root in 34% and the arch in 73%. In-hospital mortality decreased from 20.4% in 2018 to 13.9% in 2021. Compared to 2018, the adjusted mortality odds ratios were 0.87 (95%CI 0.58-1.30), 0.78 (95%CI 0.52-1.18), and 0.63 (95%CI 0.41-0.95) for 2019, 2020, and 2021, respectively. In the majority (n=222, 70%), the cause of death was related to their aortic dissection (*Figure 1*). However, 365-day survivors only died from (consequences of) their aortic dissection in 14% (6/43 deaths after 1-year), and died from other cardiovascular causes in 37% and cancer in 16%.

Conclusions
In-hospital mortality after surgery for type-A dissection in The Netherlands has decreased over recent years. Patients who survive one year after surgery, seldomly die from the consequences of their dissection, but die from other cardiovascular diseases and cancer.

Figure 1. Causes of death after surgery for type-A aortic dissection in the Netherlands.



Pitch

12.15 – 12.45 uur

COMPARATIVE ANALYSIS OF THERAPEUTIC STRATEGIES IN POST-CARDIOTOMY CARDIOGENIC SHOCK: INSIGHT INTO A HIGH-VOLUME CARDIAC SURGERY CENTER

B. Ufuk Baldan [1,2,3], Romy R. M. J. J. Hegeman [1,2], Nelleke M. J. P. Bos [4], Hans G. Smeenk [2], Robert J. M. Klautz [1,3] and Patrick Klein [1,2]

[1] Amsterdam University Medical Center, department of Cardiothoracic surgery, 1105 AZ, Amsterdam, The Netherlands; [2] St. Antonius Hospital, department of Cardiothoracic surgery, 3435 CM Nieuwegein, The Netherlands; [3] Leiden University Medical Center, department of Cardiothoracic surgery, 2333 ZA, Leiden, The Netherlands; [4] Bos Healthcare Consultancy, 1036 KM, Amsterdam, The Netherlands

Objectives
Post-cardiotomy cardiogenic shock (PCCS), which is defined as severe low cardiac output syndrome after cardiac surgery, has a mortality rate of up to 90%. No study has yet been performed to compare patients with PCCS treated by conservative means to patients receiving additional mechanical circulatory support with veno-arterial extracorporeal membrane oxygenation (ECMO).

Methods
A single-center retrospective analysis from January 2018 to June 2022 was performed.

Results
Out of 7.028 patients who underwent cardiac surgery during this time period, 220 patients (3%, $p<0.001$) developed PCCS. The patients were stratified according to their severity of shock based on the Stage Classification Expert Consensus (SCAI) group. Known risk factors for shock-related mortality, including the vasoactive–inotropic score (VIS) and plasma lactate levels, were assessed at structured intervals. In patients treated additionally with ECMO ($n=73$, $p<0.001$), the in-hospital mortality rate was 60%, compared to an in-hospital mortality rate of 85% in patients treated by conservative means (non-ECMO; $n=52$, $p=0.003$). In 18/73 (25%) ECMO patients, the plasma lactate level normalized within 48 hours, compared to 2/52 (4%) in non-ECMO patients ($p=0.002$). The morbidity of non-ECMO patients compared to ECMO patients included a need for dialysis (42% vs. 60%, $p=0.047$), myocardial infarction (19% vs. 27%, $p=0.292$), and cerebrovascular accident (17% vs. 12%, $p=0.435$).

Conclusion
In conclusion, the additional use of ECMO in PCCS holds promise for enhancing outcomes in these critically ill patients, more rapid improvement of end-organ perfusion, and the normalization of plasma lactate levels.

Pitch

12.15 – 12.45 uur

LONG-TERM OUTCOMES IN HYBRID VERSUS STANDALONE THORACOSCOPIC ABLATION IN PATIENTS WITH ATRIAL FIBRILLATION: A SYSTEMIC REVIEW AND RECONSTRUCTED INDIVIDUAL PATIENT DATA META-ANALYSIS.

Luca Aerts[1,2], Michal J. Kawczynski[1,2], Justin G.L.M. Luermans[2,3], Jos G. Maessen[1,2], Elham Bidar[1,2], Samuel Heuts[1,2], Bart Maesen[1,2]

[1]Department of Cardiothoracic Surgery, Maastricht University Medical Centre, Maastricht, The Netherland; [2]Cardiovascular Research Institute Maastricht (CARIM), Maastricht University, Maastricht, The Netherlands; [3]Department of Cardiology, Maastricht University Medical Centre, Maastricht, The Netherlands

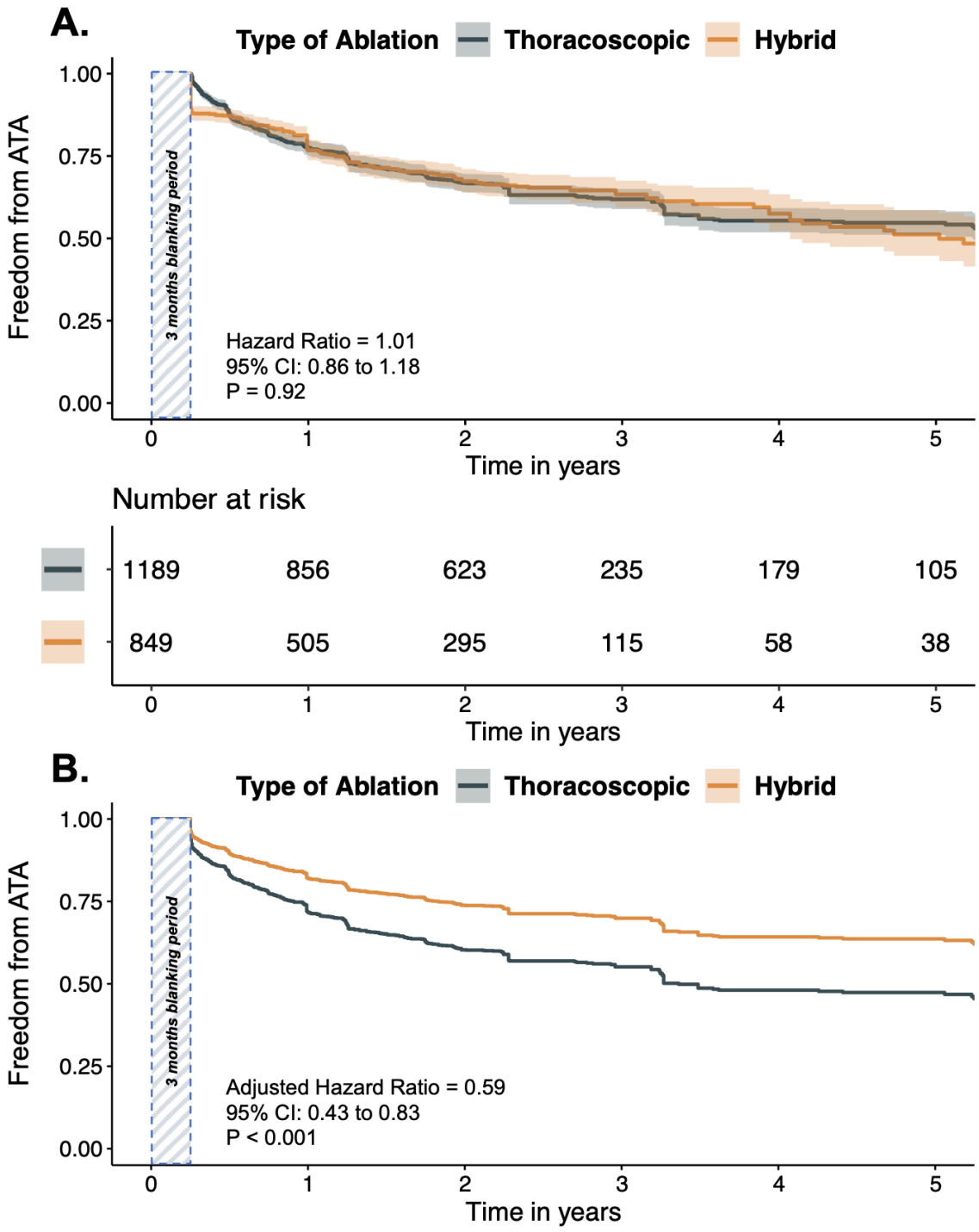
Objectives
Thoracoscopic hybrid and standalone thoracoscopic atrial fibrillation (AF) ablation have demonstrated favorable outcomes in the management of AF patients. Currently, it's unknown whether there is a difference in long-term freedom from AF when comparing these two procedures.

Methods
A systematic search (2012 – 2023) was performed using: 'thoracoscopic ablation,' 'hybrid ablation,' 'atrial fibrillation,' and various alternative spellings. Articles presenting Kaplan-Meier (KM) curves were included for pooled analysis of freedom from atrial tachyarrhythmia (ATA). Individual time-to-event data were reconstructed from the KM curves and included in a multivariable Cox and frailty Cox model with adjustments for age, sex, type of AF and AF duration.

Results
18 studies were included in the meta-analysis for long-term freedom from ATA, comprising 2215 patients. Patients undergoing hybrid ablation were older (62.0 vs. 58.8 years old, p=0.046), had less frequently paroxysmal AF-history (9.6% vs. 32.1%, p<0.01), and had a longer duration of AF-history (7.0 vs. 5.3 years, p=0.04), compared to patients undergoing standalone thoracoscopic ablation. There were no significant differences in complications between the two ablation procedures. Adjusted analysis revealed that hybrid ablation was significantly associated with greater freedom from ATA (Hazard Ratio [HR]=0.59, 95%CI: 0.43-0.83, p<0.001) compared to standalone thoracoscopic ablation (Figure 1A). Adjusted freedom from ATA at 1 year, 3 years, and 5 years was 71.6%, 55.1%, and 46.8% for thoracoscopic, and 82.0%, 69.9%, and 63.6% for hybrid ablation (Figure 1B).

Conclusion
Hybrid thoracoscopic AF-ablation is associated with a higher level of freedom from ATA when compared to standalone thoracoscopic ablation.

Figure 1. Unadjusted and adjusted KM-curves for freedom from ATA for thoracoscopic and hybrid AF-ablation.



Pitch

12.15 – 12.45 uur

STAGED HYBRID APPROACH FOR TYPE A ACUTE AORTIC DISSECTION : ZONE 2 ARCH REPLACEMENT AND COMPLETION TEVAR UPON INDICATION

Nabil Saouti,[1] Guillaume S.C. Geuzebroek,[1] Koko Li*,[1] Foeke J.H. Nauta,[1] Wilson Li,[1] Michel Verkroost,[1] Robin H. Heijmen[1]

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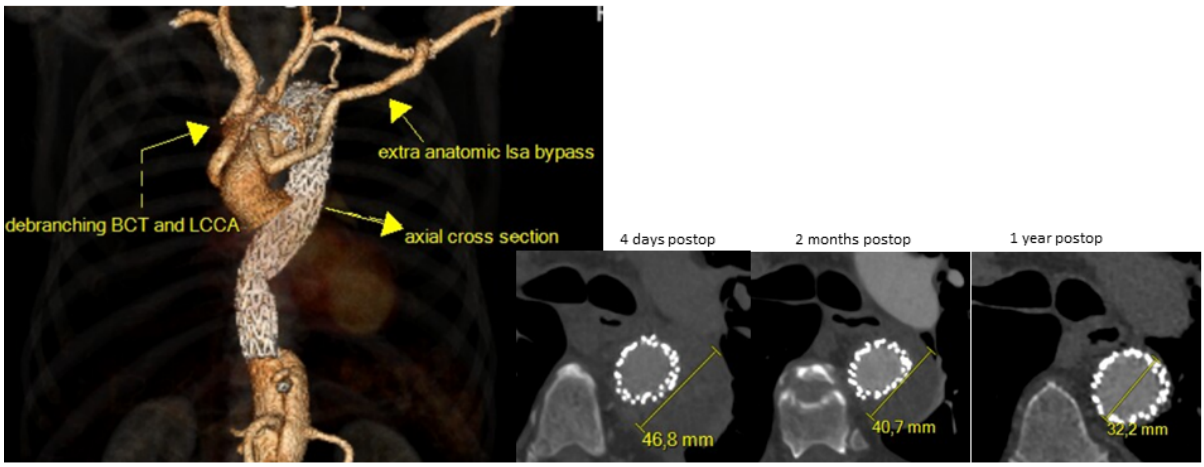
Objectives
Downstream aortic dilatation following hemiarch repair for acute type A aortic dissection (TAAD) requires complex redo surgery of the arch. To prevent this we have adopted an approach where at the index operation the distal suture line is in zone 2 and at the same time by proximalisation of the first two arch arteries creating a landing zone for a (completion) TEVAR upon indication (i.e. postdissection dilatation).

Methods
We retrospectively analyzed all patients at our center that underwent this new approach during 2022 and 2023.

Results
We identified 25 patients (out off a total of 91) that were treated by Zone 2 arch repair for TAAD. No mortality was observed. One patient had a stroke and one patient had a minor stroke which completely recovered. All patients were discharged home. At follow-up, CTA-scanning was performed to check for early dilatation at the downstream aorta. If so, completion TEVAR was performed, together with LSA-bypass grafting, the TEVAR extending from the mid-arch upto the celiac trunk to exclude false lumen flow along the entire thoracic aorta. A total of 8 patients had completion TEVAR without any neurological events. Favorable remodeling was seen in all 7 patients who had their CTA-scanning during follow-up (Figure).

Conclusion
Staged hybrid approach with zone 2 arch replacement followed by completion TEVAR upon indication may be considered a safe and promising approach in acute type A aortic dissection (Debakey type 1), to exclude the false lumen in the downstream thoracic aorta inducing favorable remodeling and preventing postdissection aneurysm formation.



Pitch

12.15 – 12.45 uur

IMPACT OF OPEN SURGICAL DESCENDING REPAIR ON AORTIC STIFFNESS AND COMPARISON WITH ENDOVASCULAR REPAIR: ANALYSIS IN AN EX VIVO PORCINE MODEL

Tim J. Mandigers[1,2], Jasper F. de Kort[1,2], Ariel F. Pascaner[3], Michele Conti[3], Martina Schembri[3], Sonja Jelic[3], Alessandro Caimi[3], Daniele Bissacco[1], Maurizio Domanin[1,4], Robin H. Heijmen[5], Joost A. van Herwaarden[2], Ferdinando Auricchio[3], Santi Trimarchi[1,4]

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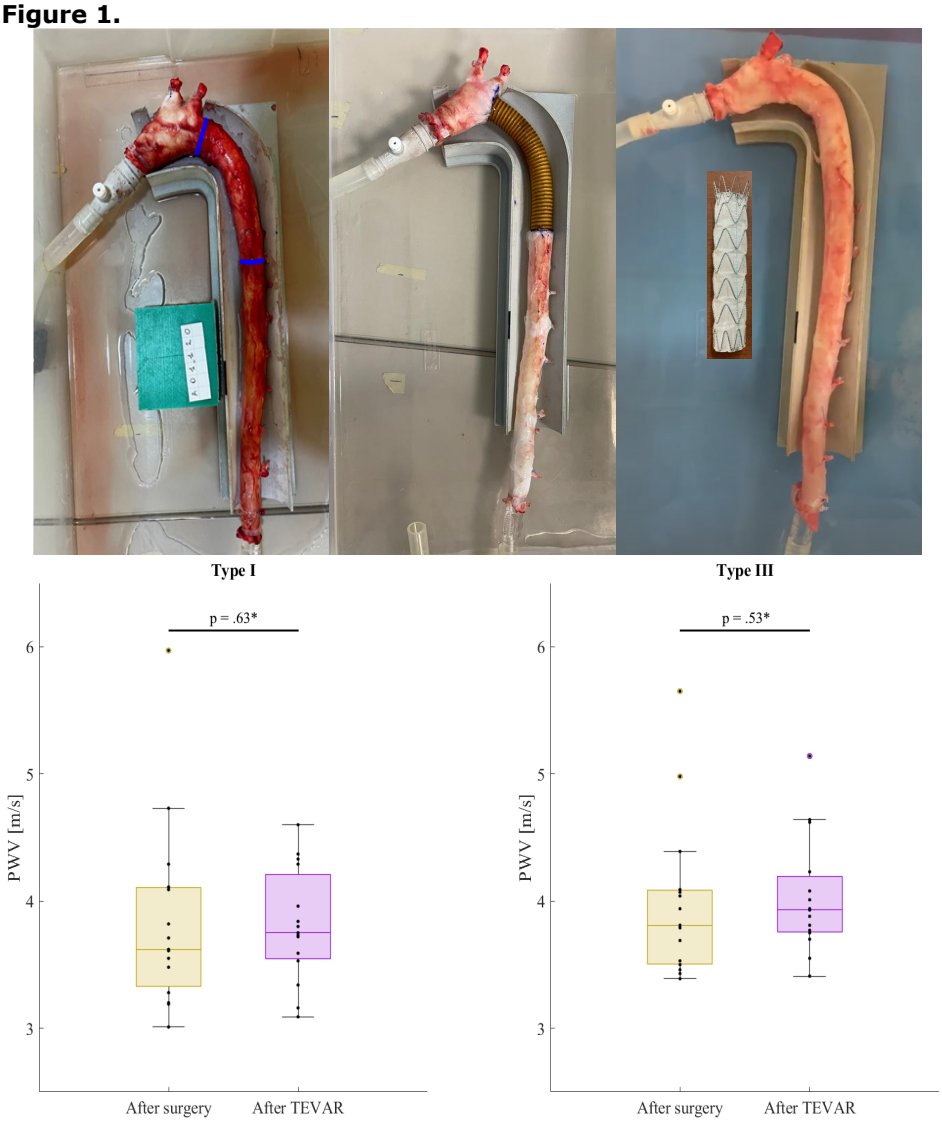
Objectives
While it is known that stent-graft deployment and acute arch angulation increase aortic stiffness, the impact of surgical interposition grafting remains unclear. We investigated the impact of open surgery on aortic stiffness and compared this with stent-graft induced aortic stiffening, utilising an *ex vivo* model.

Methods
Porcine thoracic aortas were connected to a mock circulatory loop. Baseline characteristics, proximal and distal flow curves (for PWV calculation), and blood pressures were recorded in a type I and III arch configuration. Subsequently, 10cm proximal descending aorta was excised and replaced with Dacron® (IGK0018-40S | Fig.1). After surgery, all measurements were repeated in both arch configurations. Available experimental literature data on stent-graft induced aortic stiffening was used for comparison.

Results
Fifteen aortas were prepared and attached to the circuit. After surgery, with both arch configurations, mean aortic PWV increased (Type I: 3.46 to 3.84m/s (+10.7%),p<.001); Type III: 3.61 to 3.98m/s (+10.4%),p=.001), systolic pressure remained stable, diastolic pressures decreased (Type I: 73 to 65mmHg,p<.001; Type III: 75 to 66mmHg,p<.001), and consequently mean arterial pressure decreased (Type I: 89 to 85mmHg,p=.020; Type III: 92 to 85mmHg,p=.001). Compared with stent-graft induced aortic stiffening and with both arch configurations, baseline aortic PWV was similar, and there was no difference in aortic PWV after open or endovascular repair (Type I open *vs* stent-graft: 3.84 *vs* 3.81m/s,p=.63;Type III open *vs* stent-graft: 3.98 *vs* 4.03m/s,p=.53 | Fig.1).

Conclusion
Surgical interposition grafting of the proximal descending aorta increases aortic PWV and decreases diastolic blood pressure. This aortic stiffening is comparable to stent-graft induced stiffening.

Figure 1.



Abstract

16.00 uur

VENTRICULO-ARTERIAL COUPLING IN PULMONARY REGURGITATION FOLLOWING TRANSANNULAR PATCH REPAIR OF PULMONARY STENOSIS

Rahi S Alipour Symakani[1,2,3,4*], Wouter J van Genuchten[1], Thierry Bové[5], Alexander Hirsch[6,7], Piotr Wielopolski[7], Yannick J H J Taverne[2], Willem A Helbing[1], Daphne Merkus[3], Beatrijs Bartelds[1]

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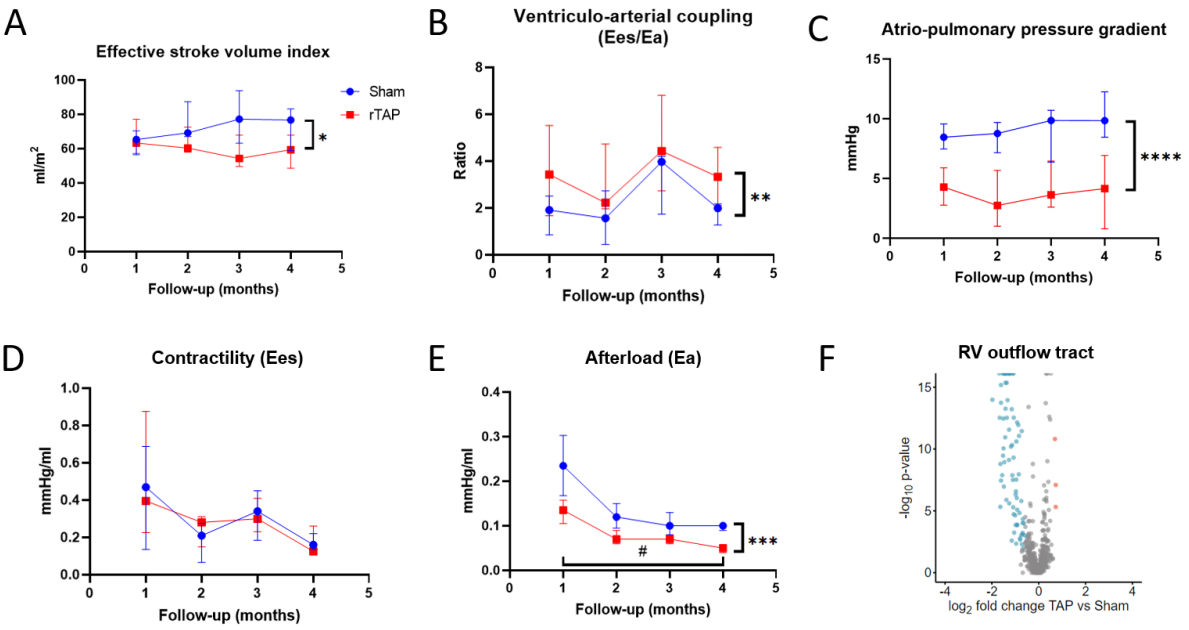
Objectives
Right ventricular (RV) failure following pulmonary regurgitation (PR) is frequently seen late after correction of tetralogy of Fallot. Clinical markers fail to predict which patients are at risk and require interventions. In this study, ventriculo-arterial coupling (VAC) was investigated as an early marker of RV dysfunction by serial assessments in a model mimicking tetralogy of Fallot.

Methods
In neonatal pigs, pulmonary artery banding induced RV hypertrophy during 1 month. Subsequently, banding was removed and PR was created by a transannular patch repair (rTAP, n=10). Sham animals (n=6) underwent sham surgeries. Over 4 months of follow-up, monthly pressure-volume loops were performed to assess contractility, afterload and their ratio VAC. Proteomics was performed on RV outflow tract and free wall myocardium.

Results
Despite decreased effective stroke volume index, VAC was preserved over time in PR. Although contractility was similar to sham, PR lowered afterload drastically and end-diastolic pulmonary artery pressures almost approximated right atrial pressure. Proteomics analysis showed changes in metabolic pathways, mainly in the outflow tract of rTAP animals.

Conclusions
VAC is preserved and not suitable as an early marker of RV dysfunction. The decrease in afterload, likely the consequence of diastolic emptying of the pulmonary artery into the RV, may pseudo-normalize systolic function. While contractility was similar to Sham, proteomics reveal an increased metabolic burden on the RV myocardium of rTAP animals, with the outflow tract being more affected than the free wall.



(A-E) Hemodynamics over time, presented as median [IQR]. (F) Differential protein expression in the RV outflow tract.

Abstract

16.15 uur

RIGHT ATRIAL FIBROSIS IS A SIGNIFICANT PREDICTOR OF INCREASED ATRIAL FIBRILLATION BURDEN BUT NOT INCIDENCE DURING 2.5 YEARS OF CONTINUOUS RHYTHM MONITORING AFTER CARDIAC SURGERY

Michal J. Kawczynski[1,2,3], Martijn D. Gilbers[2,4], Joris Winters[2,3], Aaron Isaacs[2,3], Sander Verheule[2,3], Jos G. Maessen[1,3], Bart Maesen[1,3], Uli Schotten[2,3], Elham Bidar[1,3]

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[2]Department of Physiology, Maastricht University, Maastricht, The Netherlands
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[4]Department of Cardiothoracic surgery, Medisch Spectrum Twente, Enschede, The Netherlands.

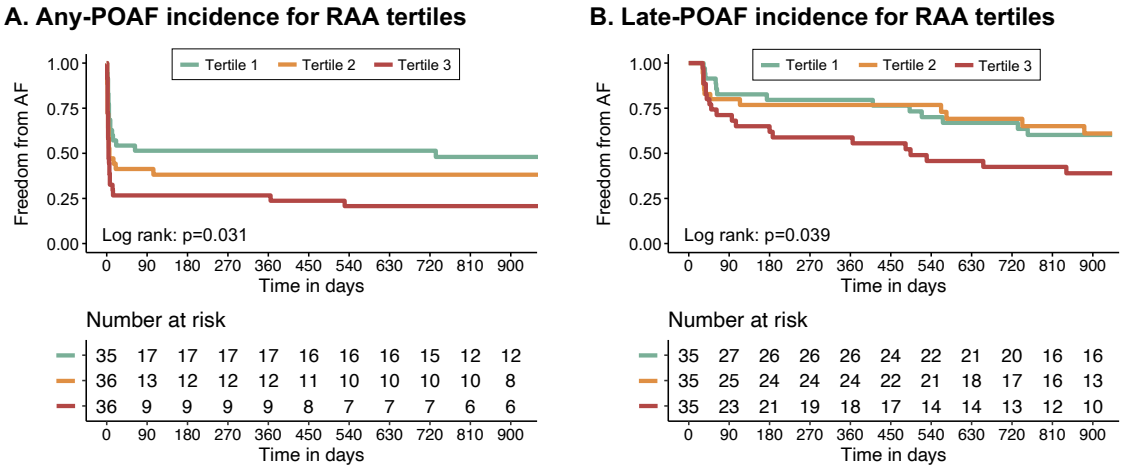
Objectives
Postoperative atrial fibrillation (POAF) frequently occurs after cardiac surgery, often with recurring episodes post-discharge (late-POAF). While clinical factors such as age and increased atrial volumes are associated with late-POAF recurrence, it is unknown if atrial histological characteristics are also linked to late-POAF. Therefore, this study aimed to investigate these associations with long-term continuous rhythm monitoring after cardiac surgery.

Methods
Consecutive patients with and without AF-history were prospectively included. Intraoperatively, biopsies were taken of left (LAA) and right atrial appendages (RAA), and all patients received an implantable loop recorder for a period of 2.5 years. Late-POAF was defined as an AF-episode lasting at least 2 minutes after the first 30 days post-surgery. Late-POAF burden was calculated as the percentage of time in AF till follow-up ending.

Results
A total of 133 patients were included (90 without and 43 with AF-history). Any-POAF occurred in 81 patients (60.9%) and late-POAF in 53 patients (40.8%). Increased RAA endomysial fibrosis was significantly associated with any-POAF and late-POAF in the unadjusted analysis (Figure 1A-B), but no longer after adjustments for age, sex, and AF-history. Increased RAA endomysial was the only histological trait significantly associated with increased overall and late-POAF burden after adjusting for confounders (Figure 1C-D).

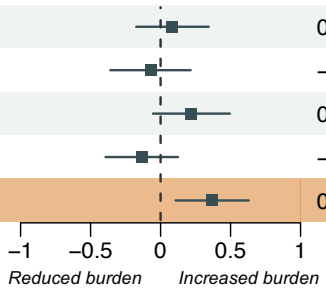
Conclusion
Increased RAA endomysial fibrosis is significantly associated with a higher late-POAF burden independently of relevant confounders. These findings suggest that while the role of RAA endomysial fibrosis in late-POAF incidence (trigger-based) may be less prominent, it is crucial in predicting late-POAF burden (substrate-based AF perpetuation).

Figure 1.



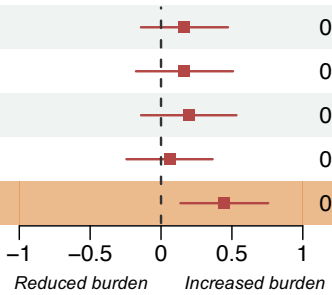
C. Adjusted analysis for any-POAF burden

Variable	Beta	P–value	Standardized Beta (95% CI)
Age, per 1 year	0.023	0.511	0.09 (–0.17 to 0.34)
Male sex	–0.069	0.613	–0.07 (–0.36 to 0.21)
AF–history	0.669	0.112	0.22 (–0.05 to 0.49)
Reduced LV function	–0.233	0.300	–0.13 (–0.39 to 0.12)
RAA endomysial fibrosis	0.114	0.007	0.37 (0.11 to 0.63)



D. Adjusted analysis for late-POAF burden

Variable	Beta	P–value	Standardized Beta (95% CI)
Age, per 1 year	0.042	0.279	0.17 (–0.14 to 0.47)
Male sex	0.772	0.329	0.17 (–0.18 to 0.51)
AF–history	0.742	0.244	0.20 (–0.14 to 0.53)
Reduced LV function	0.375	0.689	0.06 (–0.24 to 0.36)
RAA endomysial fibrosis	0.167	0.007	0.45 (0.14 to 0.76)



Abstract

16.30 uur

ARTIFICIAL INTELLIGENCE-BASED PULMONARY VESSEL SEGMENTATION: AN OPPORTUNITY FOR AUTOMATED 3D-PLANNING OF LUNG SEGMENTECTOMY

Quinten J. Mank[1], Abdullah Thabit[2], Alexander P.W.M. Maat[1], Sabrina Siregar[1], Theo van Walsum[2], Jolanda Kluin[1], Amir H. Sadeghi[1,3]

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Objectives
This study aims to evaluate an Artificial Intelligence (AI) based approach for automated segmentation of pulmonary arteries and veins in both the left and right lung from Computed Tomography (CT) images. The goal is to provide a supporting tool for surgeons in preoperative planning of lung segmentectomies by enhancing their anatomical knowledge and 3D visualization of the patient-specific anatomy.

Methods
A dataset of 126 CT scans of patients undergoing lung segmentectomy at the Erasmus MC was collected between March 2021 and December 2023. A Deep Learning (DL)-model was trained to learn segmentation maps based on manually annotated CT-scans. The DL-models were assessed using the following evaluation metrics: Dice score, Jaccard Index, and Sensitivity. Additionally, an evaluation of the clinical usability was performed using intraoperative recordings of 6 robotic-assisted segmentectomy procedures and DL-model outputs.

Results
The DL-models achieved average evaluation scores of 0.915 (Dice), 0.845 (Jaccard), and 0.85 (Sensitivity). The DL-based automatic approach demonstrated a reduction in segmentation processing time (~1.5h for manual vs. <5 min for automatic segmentation).

Conclusion
In summary, we have developed and assessed an AI-based pulmonary vessel segmentation tool, achieving a high technical accuracy (average DICE 0.915). It shows promise for lung segmentectomy planning based on a limited clinical usability analysis. Despite certain challenges such as ensuring robustness across diverse patient populations and generalizability to anatomical variations and pathological conditions within the lung, this DL approach demonstrates potential as a potent tool for pulmonary vessel segmentation. It offers promise to change the precise segmentectomy planning.

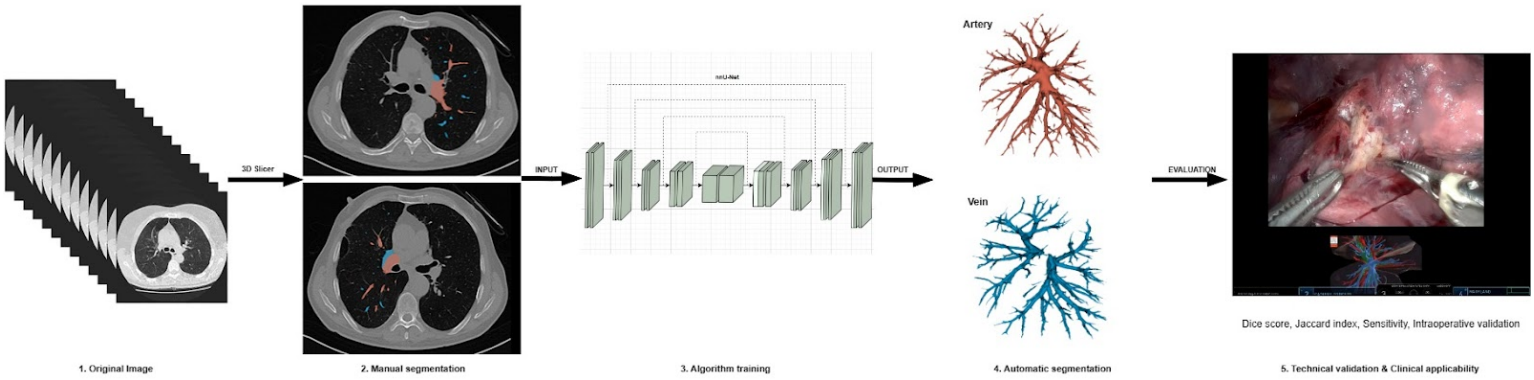

Fig 1. Workflow diagram of the DL-based pulmonary vessel segmentation.