

**PROGRAMMA
WETENSCHAPPELIJKE
VOORJAARSVERGADERING
NVT**

26 mei 2023



Nederlandse Vereniging voor
Thoraxchirurgie

Locatie

Pathé Leidsche Rijn Utrecht
Berlijnplein 100
3541 CM Utrecht

Sponsors

KM Innovations b.v.

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Transonic Europe b.v.

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Cardiac Care

Organisatie, accreditatie, ALV

Organisatie

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Abstractcommissie

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Inschrijving en accreditatie

Inschrijven voor deze wetenschappelijke voorjaarsvergadering kan via het aanmeldformulier op de website.

Deze wetenschappelijke voorjaarsvergadering wordt geaccrediteerd en gewaardeerd met 8 accreditatiepunten. De behaalde accreditatiepunten worden automatisch bijgeschreven in het persoonlijk GAIA dossier.

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 26 mei 2023

8.30 – 9.00 uur	Ontvangst en inschrijving	Foyer
9.00 uur	Opening door de voorzitter	
9.00 – 10.00 uur	Abstracts Sessievoorzitters: Linda de Heer/David Stecher	Zaal 2
9.00 uur	B. Ganizada HISTOPATHOLOGICAL FINDINGS ON IMPAIRED CELL-MATRIX INTERACTION IN ASCENDING THORACIC AORTIC ANEURYSM AND DISSECTION	
9.15 uur	H. de Beaufort FIRST TIME SURGICAL AORTIC VALVE REPLACEMENT: NATIONWIDE TRENDS AND OUTCOMES IN AN ANALYSIS FROM THE NETHERLANDS HEART REGISTRATION	
9.30 uur	S.E. Kaffka genaamd Dengler HEART DONATION AND TRANSPLANTATION OF CIRCULATORY DEATH DONORS: THE DUTCH EXPERIENCE	
9.45 uur	I.A. Ertugrul EX-SITU COLD OXYGENATED PERFUSION IN DONATION AFTER CIRCULATORY DEATH HEART TRANSPLANTATION	
10.00 – 10.30 uur	Pitches Sessievoorzitters: Linda de Heer/David Stecher	
	B.J.J. Velders PLEDGETED VERSUS NON-PLEDGETED SUTURES IN AORTIC VALVE REPLACEMENT: INSIGHTS FROM A PROSPECTIVE MULTICENTER TRIAL	
	F. Sampon GENDER AS AN INDEPENDENT PREDICTOR FOR RED BLOOD CELL TRANSFUSION IN CORONARY BYPASS GRAFTING: DATA FROM THE NETHERLANDS HEART REGISTRATION.	
	F. Nauta CARDIAC REMODELLING FOLLOWING THORACIC ENDOVASCULAR AORTIC REPAIR FOR DESCENDING AORTIC ANEURYSMS	
	B.U. Baldan A STAGED APPROACH TO BRANCHED THORACIC ENDOVASCULAR AORTIC REPAIR OF THORACOABDOMINAL ANEURYSMS TO PREVENT SPINAL CORD INJURY	

M. Gerritse

ANTEGRADE CEREBRAL PERFUSION FLOW: HOW LOW IS TOO LOW?

J.R. Olsthoorn

PREOPERATIVE PLANNING WITH THREE-DIMENSIONAL PRINTING FOR CLOSURE OF VENTRICULAR SEPTAL RUPTURE

10.30 – 11.15 uur	Koffiepauze met postersessie pitches	Foyer
11.15 – 12.15 uur	Abstracts Sessievoorzitters: Patrick Klein/Roemer Vos	Zaal 2
11.15 uur	W. Bakhuis ESSENTIAL SURGICAL PLAN MODIFICATIONS AFTER VIRTUAL REALITY PLANNING IN 50 CONSECUTIVE SEGMENTECTOMIES	
11.30 uur	F. Akca LEARNING CURVE OF THORACOSCOPIC, NON-ROBOTIC, HARVEST OF THE LEFT INTERNAL MAMMARY ARTERY IN ENDOSCOPIC CORONARY ARTERY BYPASS PROCEDURES	
11.45 uur	M.J. Kawczynski NEW ONSET, RECURRENCE AND PROGRESSION OF ATRIAL FIBRILLATION AFTER CARDIAC SURGERY DURING 2.5 YEARS OF CONTINUOUS RHYTHM MONITORING	
12.00 uur	S. Heuts A NOVEL APPROACH TO DEFINE THE OPTIMAL ANNUAL CASE VOLUME FOR CARDIOVASCULAR INTERVENTIONS IN NEED OF CENTRALIZATION	
12.15 – 12.45 uur	Pitches Sessievoorzitters: Patrick Klein/Roemer Vos	
	M.T. Vervoorn/S.E. Kaffka genaamd Dengler THE CREATION OF A CARDIAC BIOREACTOR - INTRODUCING THE REGMED XB CARDIOVASCULAR MOONSHOT	
	M.L. Notenboom AORTIC VALVE RECONSTRUCTION IN NONELDERLY ADULTS: A SYSTEMATIC REVIEW, META-ANALYSIS AND MICROSIMULATION STUDY	
	S.J.J. Langmuur CLAMSHELL VS. ANTEROLATERAL THORACOTOMY FOR BILATERAL LUNG TRANSPLANTATION: A SINGLE-CENTRE EXPERIENCE	

P. Sivapragasam

THE PREDICTIVE VALUE OF PREOPERATIVE PULMONARY FUNCTION ON POSTOPERATIVE PULMONARY COMPLICATIONS IN OPEN DESCENDING AND THORACOABDOMINAL AORTIC REPAIR.

T.J.P. Heeringa

CONCOMITANT ANTERIOR MITRAL VALVE LEAFLET EXTENSION VERSUS ISOLATED SURGICAL SEPTAL MYECTOMY IN HYPERTROPHIC OBSTRUCTIVE CARDIOMYOPATHY

S.A. Max

VIRTUAL REALITY SIMULATOR VERSUS CONVENTIONAL ADVANCED LIFE SUPPORT TRAINING FOR RESUSCITATION POST-CARDIAC SURGERY: A RANDOMISED CONTROLLED TRIAL

12.45 – 13.45 uur	Lunch met postersessie pitches	Foyer
13.45 – 15.00 uur	Algemene Ledenvergadering	Zaal 2
15.00 – 15.30 uur	Koffiepauze	Foyer
15.30 – 16.00 uur	Themasessie: De groene OK	Zaal 2
16.00 – 17.00 uur	Abstracts Sessievoorzitters: Yannick Taverne/Ferdi Akca	Zaal 2
16.00 uur	J.R. Olsthoorn MINIMALLY INVASIVE MITRAL VALVE SURGERY COMPARED TO STERNOTOMY IN PATIENTS OVER 70 YEARS OLD: A RETROSPECTIVE NATIONWIDE MULTICENTER STUDY IN THE NETHERLANDS.	
16.15 uur	I. Mousavi ELDERLY PATIENTS BENEFIT FROM MINIMALLY INVASIVE MITRAL VALVE SURGERY; PERIOPERATIVE RISK MANAGEMENT MATTERS	
16.30 uur	S. el Mathari EARLY MITRAL VALVE REPAIR SURGERY VERSUS ACTIVE SURVEILLANCE IN PATIENTS WITH ASYMPTOMATIC SEVERE PRIMARY MITRAL REGURGITATION; INSIGHTS FROM THE DUTCH AMR REGISTRY	

16.45 uur	J.M. Klok PERSPECTIVES ON SHARED DECISION-MAKING IN THE TREATMENT OF NON-SMALL CELL LUNG CANCER STAGE I-IV: INSIGHTS FROM PATIENTS AND CLINICIANS	
17.00 uur	Borrel en uitreiking assistentenprijzen beste abstract presentatie en beste pitch Ter beschikking gesteld door de Nederlandse Vereniging voor Thoraxchirurgie	Foyer
17.00 – 17.30 uur	Tekenen voor accreditatie	Inschrijfbalie

09.00 uur

HISTOPATHOLOGICAL FINDINGS ON IMPAIRED CELL-MATRIX INTERACTION IN ASCENDING THORACIC AORTIC ANEURYSM AND DISSECTION

Berta Ganizada^{1,2,9}, Koen Reesink^{3,9}, Mitch Ramaekers^{4,5,9}, Austin Isabella^{2,3}, Mike van der Linden², Lisa van der Looij², Jack Cleutjens⁷, Roberto Lorusso^{1,9}, Michael Jacobs^{8,9}, Rory Koenen^{2,9}, Ehsan Natour^{1,9}, Simon Schalla^{4,5,9}, Jos G. Maessen^{1,9}, Leon J. Schurgers^{2,6,9*}, Elham Bidar^{1,9*}

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Objectives

We hypothesize that impaired cell-matrix interaction plays a key role in ascending thoracic aortic aneurysm (aTAA) formation and type-A dissection (aTAAD). We investigated cell-matrix interaction in aortic tissues collected during open-heart surgery.

Methods

We analysed 41 aTAA, 17 aTAAD patients, and 10 controls after coronary bypass or aortic valve replacement. Medial collagen and elastin fractions (%), smooth muscle cell density and contractile phenotype markers (α -SMA and Calponin-1) as well as expression of α -antitrypsin (elastase inhibitor) were determined in the (intact) cross-sectional area of the ascending aortic tissue. In addition, wall shear stress (WSS) was calculated from pre-operative 4D-flow MRI.

MRI was also used to facilitate anatomical correlation of cell-matrix findings to WSS values.

Results

Collagen% was significantly lower in aTAAD ($p < 0.01$), but not in aTAA ($p = 0.93$). Elastin% was lower in both aTAA and aTAAD ($p < 0.001$) and accompanied by thinner elastic lamellae ($p < 0.0001$). Expression of smooth muscle contractile markers α -SMA ($p < 0.04$) and Calponin-1 ($p < 0.001$) were lower in aTAA than control. Cell density was increased in both aTAA and aTAAD ($p < 0.03$). α -antitrypsin levels were lower in aTAA than in controls ($p = 0.055$; $n = 10$). In aTAA, WSS in the outer curvature ($p < 0.01$) was highest and associated with lowest elastin% ($p < 0.04$) and lamellar thickness ($p < 0.01$).

Conclusion

Our study corroborates the known association of elastin degeneration with increased WSS. In addition we found reduced contractile phenotypes of smooth muscle cells and lower α -antitrypsin expression in aTAA which is a maker of impaired elastase inhibition. Causal relationships between these traits must be further investigated.

09.15 uur

FIRST TIME SURGICAL AORTIC VALVE REPLACEMENT: NATIONWIDE TRENDS AND OUTCOMES IN AN ANALYSIS FROM THE NETHERLANDS HEART REGISTRATION

Edgar J. Daeter¹, Hector W.L. de Beaufort¹, Maaïke M. Roefs², Wim-Jan P. van Boven³, Dennis van Veghel², Niels P. van der Kaaij⁴ on behalf of the Cardiothoracic Surgery Registration Committee of the Netherlands Heart Registration[‡]

¹Department of Cardiothoracic Surgery, St. Antonius Hospital, Nieuwegein, ²Netherlands Heart Registration, Utrecht, ³Department of Cardiothoracic Surgery, Amsterdam University Medical Center, Amsterdam, ⁴Department of Cardiothoracic Surgery, University Medical Center Utrecht, Utrecht
‡ Membership of the Cardiothoracic Surgery Registration Committee of the Netherlands Heart Registration is provided below.

Objectives

The current study was performed in order to describe trends and outcomes for patients undergoing surgical aortic valve replacement (SAVR) in the Netherlands.

Methods

The Netherlands Heart Registration (NHR) database was used to report the number and outcomes of isolated, primary SAVR procedures performed in adult patients from 2007 to 2018.

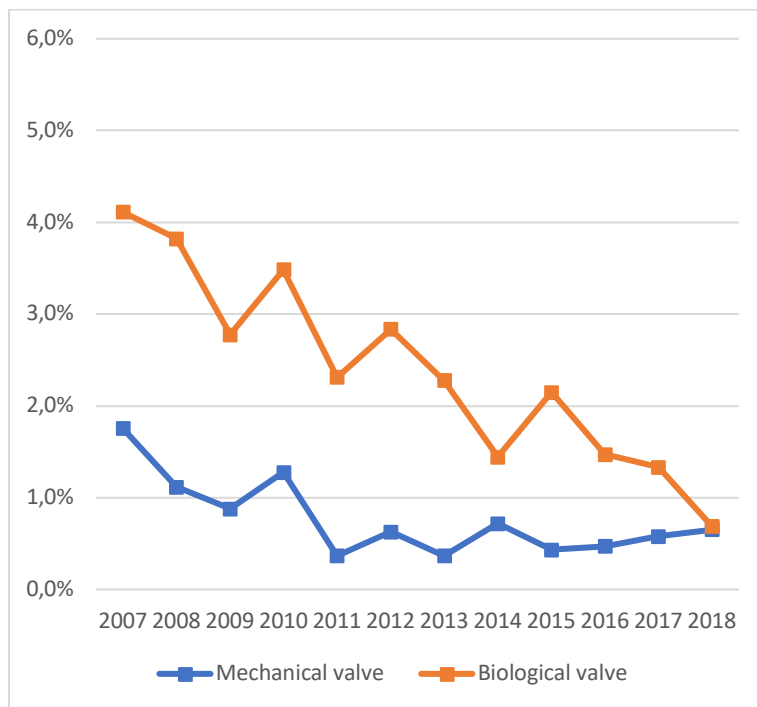
Results

A total of 17142 SAVR procedures were included [biological prosthesis (BP): 13355 (77.9%); mechanical prosthesis (MP): 3604 (21.0%)]. Median age at surgery decreased from 70 (BP: 74; MP: 59) years in 2007 to 69 (BP: 70; MP: 55) years in 2018; logistic EUROSCORE I decreased from 4.6 (BP: 6.3; MP: 2.3) to 4.0 (BP: 4.3; MP: 2.1). The 120-day all-cause mortality decreased from 3.3% (BP: 4.1%; MP: 1.8%) in 2007 to 0.7% (BP: 0.7%; MP: 0.7%) in 2018. Median duration of follow-up was 76 [IQR 53-111] months. Ten-year survival was 71.2% (BP: 70.6%; MP: 73.2%) and 10-year freedom from reintervention was 95.2% (BP: 94.1%; MP: 97.5%). For patients under the age of 60, 10-year survival was 89.7% with a BP and 91.9% with a MP and 10-year freedom from reintervention was 89.1% with a BP and 95.3% with a MP.

Conclusions

Between 2007 and 2018, age and risk profile of SAVR patients decreased, especially for patients treated with a BP. The 120-day mortality decreased over time. Patients undergoing isolated SAVR with either a BP or a MP nowadays have a risk of early mortality of <1% and 10-year freedom from valve-related reintervention of >90%.

Figure showing 120-day mortality (\pm SE) after surgical aortic valve replacement by year and by type of valve prosthesis.



Members of the Cardiothoracic Surgery Registration Committee of the Netherlands Heart Registration

S		Bramer	Amphia
WJP	van	Boven	Amsterdam UMC, locatie AMC
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EJ		Daeter	St. Antonius Ziekenhuis
NP	van der	Kaaij	UMC Utrecht
Y.L.		Douglas	Universitair Medisch Centrum Groningen

09.30 uur

HEART DONATION AND TRANSPLANTATION OF CIRCULATORY DEATH DONORS: THE DUTCH EXPERIENCE

S.E. Kaffka genaamd Dengler¹, O.C. Manintveld^{2,3}, Y.J.H.J. Taverne^{3,4}, K. Damman⁵, L.W. van Laake⁶, M.E. Erasmus⁷, N.P. van der Kaaij¹

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Background

Shortage of donor hearts can be reduced using hearts of circulatory death donors. On the 15th of March 2021, a national program started using the Direct Procurement and Perfusion approach. Here we report the early outcome of DCD heart transplantation in the Netherlands.

Methods

After the heart were excised they were normothermically reperfused with donor blood on the Organ Care System (OCS), transferred on the OCS to recipient center and implanted with conventional techniques. The following data were collected: (donor) age, cardiac function, date, cause of death; (recipient) age, underlying disease, history of cardiac surgery, presence of a ventricular assist device (VAD), survival, incidence of primary graft dysfunction (PGD), postoperative extra corporeal life support (ECLS), rejection, and acute kidney injury (AKI) requiring dialysis.

Results

Between March 2021 and March 2023, 66 donor procedures were attended of which 56 did proceed to donation. On the OCS, 10 hearts were declined and 46 hearts were transplanted (retrieval rate 70%). Mean recipient age was 49 years, 65% of the cases were bridged with a long-term VAD and 74% had previous cardiac surgery. The survival rate post-transplant was 93% (maximum follow-up 2 years). 20% of the patients developed severe PGD requiring veno-arterial ECLS, whereafter cardiac function recovered. One patient was treated for a grade 2 rejection. 35% developed AKI requiring short term dialysis.

Conclusions

Implementation of a DCD heart transplantation program in the Netherlands resulted in 46 extra heart transplantations within a period of 2 years with good survival.

09.45 uur

EX-SITU COLD OXYGENATED PERFUSION IN DONATION AFTER CIRCULATORY DEATH HEART TRANSPLANTATION FOLLOWING EITHER DIRECT PROCUREMENT OR IN-SITU NORMOTHERMIC REGIONAL PERFUSION

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Objectives

Heart transplantation (HTX) in donation after circulatory death (DCD) is increasingly being performed to address the severe organ shortage. Currently, DCD HTX relies on warm perfusion using either in-situ normothermic regional perfusion (NRP) or ex-situ normothermic machine perfusion. In this study, we explore an alternative: oxygenated hypothermic machine perfusion (HMP) using a novel clinically applicable perfusion system, which is compared to NRP with static cold storage (SCS).

Methods

In a porcine model, DCD HTX was performed in the following groups (1) NRP and SCS (2) NRP and HMP or (3) direct procurement (DPP) and HMP. After weaning from cardiopulmonary bypass (CPB), biventricular function was assessed by admittance and Swan-Ganz catheters.

Results

Transplanted hearts in the HMP groups showed significantly increased biventricular contractility (end-systole elastance) 2 hours post-CPB (left ventricle absolute change: NRP-HMP: $+1.8 \pm 0.56$, $p=0.047$, DPP-HMP: $+1.5 \pm 0.43$, $p=0.045$ and NRP-SCS: $+0.97 \pm 0.47$ mmHg/ml, $p=0.21$, Figure 1A; right ventricle absolute change: NRP-HMP: $+0.50 \pm 0.12$, $p=0.025$, DPP-HMP: $+0.82 \pm 0.23$, $p=0.039$ and NRP-SCS: $+0.28 \pm 0.26$, $p=0.52$, Figure 1B.) while receiving significantly less dobutamine to maintain a cardiac output >4 L/min compared to SCS. Post-HTX, both HMP groups showed significantly less increments in plasma Troponin-T compared to SCS.

Conclusion

DCD hearts can be directly procured and preserved using the novel HMP technique. Both HMP groups showed increased contractility post-HTX compared to SCS. HMP can serve as a valuable alternative to warm ex-situ perfusion with an additional safety feature of the hearts being stored cold if the machine perfusion were to arrest and, at the same time, avoid the ethical issues of NRP.

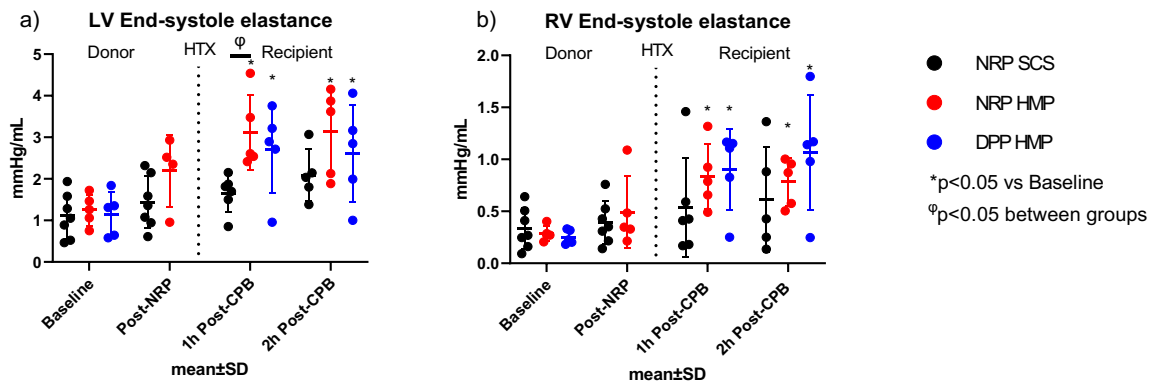


Figure 1. Systolic function measured as A) Left ventricular (LV) end-systole elastance and B) Right ventricular (RV) end-systole elastance. CPB: cardiopulmonary bypass. DPP: direct procurement and perfusion. HMP: hypothermic machine perfusion. HTX: heart transplantation. NRP: Normothermic regional Perfusion. SCS: static cold storage.

10.00 – 10.30 uur

PLEDGETED VERSUS NON-PLEDGETED SUTURES IN AORTIC VALVE REPLACEMENT: INSIGHTS FROM A PROSPECTIVE MULTICENTER TRIAL

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Objectives

To compare short- and mid-term clinical and echocardiographic outcomes according to the use of pledgeted sutures during surgical aortic valve replacement (SAVR).

Methods

Patients with aortic stenosis or regurgitation requiring SAVR were enrolled in a prospective cohort study to evaluate the safety of a new stented bioprosthesis. Outcomes were analyzed according to the use of pledgets (*pledgeted group*) or no pledgets (*non-pledgeted group*). The primary outcome was a composite of thromboembolism, endocarditis, and major paravalvular leak at 5 years of follow-up. Secondary outcomes included multiple clinical endpoints and hemodynamic outcomes. Propensity score matching was performed to adjust for confounding, and subanalyses with small valve sizes (<23 mm) and suturing techniques were performed.

Results

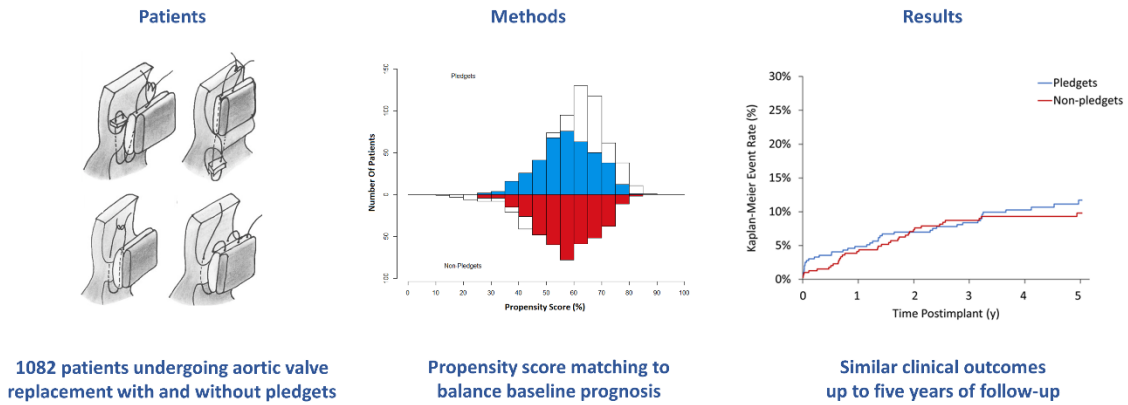
The pledgeted group comprised 640 patients (59%), and the non-pledgeted group 442 (41%), with baseline discrepancies in demography, co-morbidities, and stenosis severity. No significant differences were observed in any outcome. After propensity score matching, the primary outcome occurred in 41 (11.7%) patients in the pledgeted and 36 (9.8%) in the non-pledgeted group ($p = 0.51$). The effective orifice area was smaller in the pledgeted group ($p = 0.045$), while no difference was observed for the mean or peak pressure gradient. Separate subanalyses with small valve sizes and suturing techniques did not demonstrate relevant differences.

Conclusions

In this large propensity-score-matched cohort, comprehensive clinical outcomes were comparable between patients undergoing SAVR with pledgeted and non-pledgeted sutures up to 5 years of follow-up (*Figure 1*), but pledgets might lead to a slightly smaller EOA in the long run.

Figure 1. Graphical representation of study design and outcomes.

To compare clinical and echocardiographic outcomes according to the use of pledgeted sutures during aortic valve replacement



Based on comprehensive clinical outcomes, there is no preferred suturing technique

10.00 – 10.30 uur

GENDER AS AN INDEPENDENT PREDICTOR FOR RED BLOOD CELL TRANSFUSION IN CORONARY BYPASS GRAFTING: DATA FROM THE NETHERLANDS HEART REGISTRATION

Mara-Louise Wester¹, Fleur Sampon¹, Jules R Olsthoorn¹, Mohamed A Soliman-Hamad¹, Saskia Houterman^{2,3}, Angela HEM Maas⁴, Maaïke M Roefs³, Michael I Meesters⁵, Joost FJ ter Woorst¹ on behalf of the Cardiothoracic Surgery Registration Committee of the Netherlands Heart Registration⁶

¹ Department of Cardiothoracic Surgery, Catharina Hospital Eindhoven, the Netherlands, ² Department of Education and Research, Catharina Hospital Eindhoven, the Netherlands, ³ Netherlands Heart Registration, Utrecht, the Netherlands, ⁴ Department of Cardiology, Radboud University Medical Center, Nijmegen, the Netherlands, ⁵ Department of Anesthesiology, Catharina Hospital Eindhoven, the Netherlands, ⁶ See addendum for Cardiothoracic Surgery Registration Committee members of the Netherlands Heart Registration

Objective(s)

The aim of this study was to evaluate the number of transfusions including red blood cell (RBC), platelets, and fresh frozen plasma (FFP) after coronary artery bypass grafting (CABG) in the Netherlands. Furthermore, we aim to identify sex-related predictors for perioperative blood transfusion.

Methods

A retrospective multi-center cohort study. Data were collected from January 2013 to December 2021 from the Netherlands Heart Registration (NHR) database. Patients who underwent isolated CABG with or without extracorporeal circulation (ECC) in the Netherlands were included. Primary outcome was the occurrence of blood transfusion, defined as transfusions perioperative and during the length of the hospital admission after CABG. In addition, a differentiation was made in the type of transfusion (packed RBC, platelets and FFP). Logistic regression analysis was performed to retrieve independent variables associated with blood product transfusion with an additional focus on gender.

Results

In the overall cohort (n= 42,388) the number of patients who received transfusion of any type was 27.0% (n= 11,428), women received more RBC transfusions compared to men (45.4% versus 15.6%, p<0.001). There was difference between the sexes regarding platelet transfusion (women 10.0% versus men 11.1%, p=0.005) but not in FFP transfusion. Female sex was an independent predictor for RBC and platelet transfusion after multivariate logistic regression analysis.

Conclusions

The incidence of any blood transfusion was 27.0% and was higher among women than among men. Female sex was an independent predictor for receiving RBC and platelets after CABG.

Table 1: Perioperative blood transfusion of male and female patients who underwent CABG.

	Total cohort n=42,388	Men n=34,300	Women n=8,088	p-value
Any transfusion , n (%)	11,428 (27.0)	7,582 (22.1)	3,846 (47.6)	<0.001
Packed Red Blood Cells, n (%)	9,021 (21.3)	5,350 (15.6)	3,671 (45.4)	<0.001
Platelet, n (%)	4,615 (10.9)	3,806 (11.1)	809 (10.0)	0.005
FFP, n (%)	1,488 (3.5)	1,186 (3.5)	302 (3.7)	0.225

CABG: Coronary Artery Bypass Grafting, FFP: Fresh Frozen Plasma

10.00 – 10.30 uur

CARDIAC REMODELLING FOLLOWING THORACIC ENDOVASCULAR AORTIC REPAIR FOR DESCENDING AORTIC ANEURYSMS

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¹Department of Surgery, University of Michigan, Ann Arbor, MI, USA, ²Department of Vascular Surgery, University Medical Center Utrecht, Utrecht, Netherlands, ³Thoracic Aortic Research Center, Policlinico San Donato IRCCS, San Donato Milanese, Italy, ⁴Division of Imaging Sciences and Biomedical Engineering, King's College London, London, UK, ⁵Department of Cardiothoracic Surgery, Amsterdam University Medical Center, NL, ⁶Department of Cardiology, University of Michigan, Ann Arbor, MI, USA, ⁷Department of Cardiac Surgery, University of Michigan, Ann Arbor, MI, USA, ⁸Department of Biomedical Engineering, University of Michigan, Ann Arbor, MI, USA, * presenting author

Objectives

Current endografts for thoracic endovascular aortic repair (TEVAR) are much stiffer than the aorta and have been shown to induce acute stiffening. In this study, we aimed to estimate the impact of TEVAR on left ventricular (LV) stroke work (SW) and mass using a non-invasive image-based workflow.

Methods

The University of Michigan database was searched for patients treated with TEVAR for descending aortic pathologies (2013-2016). Patients with pre-TEVAR and post-TEVAR computed tomography angiography and echocardiography were selected. LV SW was estimated via patient-specific fluid-structure interaction analyses. LV remodeling was quantified through morphological measurements using echocardiography and electrocardiographic-gated computed tomography angiography data.

Results

Eight subjects were included in this study, with a mean age of 68 years. Six patients were women. All patients were prescribed antihypertensive drugs following TEVAR. The fluid-structure interaction simulations computed a 26% increase in LV SW post-TEVAR (0.94 to 1.18 J, P=0.012). Morphological measurements revealed an increase in the LV mass index post-TEVAR of +26% in echocardiography (72 g/m² to 91 g/m², P=0.017) and +15% in computed tomography angiography (52 g/m² to 60 g/m², P=0.043), Figure 1. The post- to pre-TEVAR LV mass index ratio was positively correlated with the post- to pre-TEVAR ratios of SW and the mean blood pressure ($\rho=0.690$, P=0.058 and $\rho=0.786$, P=0.021, respectively).

Conclusion

TEVAR was associated with increased LV SW and mass during follow-up. Medical device manufacturers should develop more compliant devices to reduce the stiffness mismatch with the aorta. Additionally, intensive antihypertensive management is needed to control blood pressure post-TEVAR.

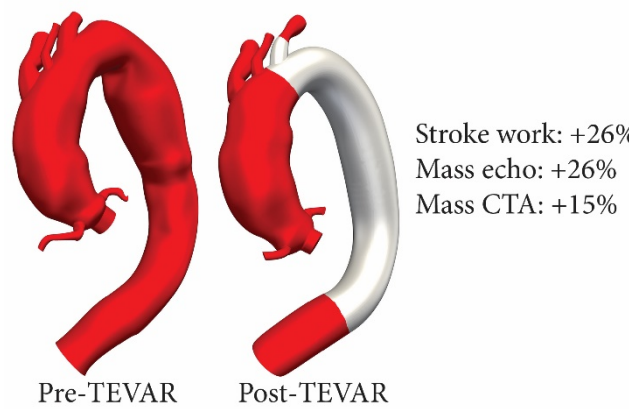


Figure 1. Left ventricular stroke work and mass increase following TEVAR.

10.00 – 10.30 uur

A STAGED APPROACH TO BRANCHED THORACIC ENDOVASCULAR AORTIC REPAIR OF THORACOABDOMINAL ANEURYSMS TO PREVENT SPINAL CORD INJURYB.U. Baldan¹, H.W.L. de Beaufort,¹ T.J. Mandigers,¹ J.A. Vos,² U. Sonker,¹ P. Klein,¹ H.G. Smeenk¹¹Department of Cardiothoracic Surgery, St Antonius Hospital, Nieuwegein, The Netherlands²Department of Interventional Radiology, St Antonius Hospital, Nieuwegein, The Netherlands**Objective**

To report outcomes of a staged approach to branched thoracic endovascular aortic repair (B-TEVAR) of patients with type II – IV thoracoabdominal aneurysm (TAAA).

Methods

The staged approach to B-TEVAR involves an interval between the initial procedure, in which most of the aorta is covered by a stent graft but the aneurysm is not fully excluded, allowing preconditioning of the spinal cord, and the completion procedure, in which the final branch vessel is covered and the aneurysm excluded. We performed a retrospective review of all consecutive patients treated from 2020 to 2022.

Results

Seventeen patients were included. Mean age was 71 years, 11(65%) were females. There were 12(70%) type II, 1(6%) type III, and 4(24%) type IV TAAAs with a median diameter of 65 mm. The median duration between the initial and the completion procedure was 70 days. No ruptures occurred in this period. Cerebrospinal fluid drainage was used in 8(47%) patients during the initial and 1(6%) patient during the completion procedure. The technical success rate was 88%: in two patients a type 1 endoleak was present on completion angiography. There were no instances of spinal cord injury or new dialysis within thirty days, and the mortality rate was 7%(n=1) due to pneumonia. Table 1 demonstrates fourteen patients who underwent CT follow-up at 3-6 months. There were 3(21%) endoleaks, 0 new dialysis and 1/50(2%) new branch vessel occlusions.

Conclusions

A staged approach to B-TEVAR for TAAA shows acceptable early outcomes with a spinal cord injury rate of 0%.

Patients (n=14)	
Diameter median, mm	64 [59 – 78]
Endoleaks	3 (21%) (type 1: n=2, type II: n=1)
Patency vessels	49/50 (98%)
Dialysis needed	0
Spinal cord injury	0

Table 1. Follow-up patients, 3 to 6 months

10.00 – 10.30 uur

ANTEGRADE CEREBRAL PERFUSION FLOW: HOW LOW IS TOO LOW?

Matthijs Gerritse¹, Thomas J. van Brakel², Marloes van Hoeven¹, Eddy Overdeest¹, Mohamed Soliman-Hamad²

¹ Department of Extracorporeal Circulation, Catharina Hospital, Eindhoven; ² Department of Cardiothoracic Surgery, Catharina Hospital, Eindhoven

Objectives

Systemic hypothermia with bilateral antegrade selective cerebral perfusion (ASCP) is the best cerebral protective strategy for type A aortic dissection surgery. Although ASCP flow of 10 mL/kg/min is most commonly recommended, optimal flow rates remain subject of debate and the target ASCP flow cannot always be reached due to limitations on maximal perfusion pressure. This study aimed to analyze the correlation between ASCP flow, regional cerebral oxygen saturation (rSO₂), and neurologic outcomes.

Methods

Retrospective analysis was performed on 140 patients with acute type A aortic dissection who underwent surgery with bilateral ASCP between 2015 and 2021. The correlation between ASCP flow and rSO₂ was analyzed with linear regression.

Results

There was no significant correlation between ASCP flow in the brachiocephalic artery and rSO₂ for the right hemisphere ($R^2=.02$, $P=.851$), or for ASCP flow in the left common carotid artery and rSO₂ for the left hemisphere ($R^2=.04$, $P=.618$). rSO₂ values for five patients who were diagnosed with a postoperative watershed infarction were not significantly lower than those who were not (left hemisphere: 64.8 ± 4.5 vs 68.4 ± 7.6 ; $P=.298$, right hemisphere: 67.0 ± 5.1 vs 66.9 ± 7.0 ; $P=.953$). The total ASCP flow for patients with a watershed infarction was 6.0 ± 1.8 mL/kg/min while patients without a watershed infarction received 7.4 ± 1.9 mL/kg/min ($P=.105$).

Conclusion

In this study ASCP flow rate was not significantly correlated with rSO₂ or watershed infarctions. Achieving the currently advised ASCP flow of 10 mL/kg/min may not be necessary for all patients. Future studies should investigate the safe limits of ASCP flow for individual patients.

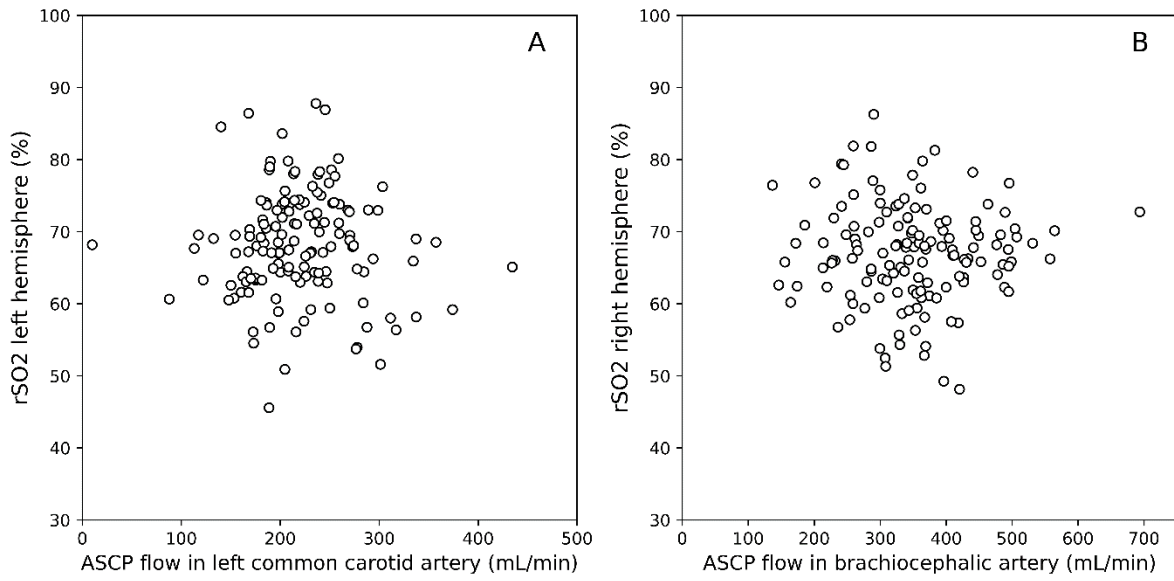


Figure 1. Scatterplots of ASCP flow in the left common carotid artery and oxygen saturation of the left hemisphere (A), and ASCP flow in the brachiocephalic artery and oxygen saturation of the right hemisphere (B). ASCP: antegrade selective cerebral perfusion; rSO2: regional cerebral oxygen saturation

10.00 – 10.30 uur

PREOPERATIVE PLANNING WITH THREE-DIMENSIONAL PRINTING FOR CLOSURE OF VENTRICULAR SEPTAL RUPTURE.

Jules R Olsthoorn¹, Sjoerd Bouwmeester², Pim Tonino², Remy Karsemakers³, Remco Felten³, Andrew Tjon Joek Tjien¹, Thomas van Brakel¹, Niels Verberkmoes¹, Ka Yan Lam¹

¹Department of cardiothoracic Surgery, Catharina Hospital, the Netherlands, ²Department of Cardiology, Catharina Hospital, the Netherlands, ³Department of Medical Technology, Catharina Hospital, the Netherlands.

Objectives

Post myocardial infarction ventricular septal rupture (VSR) is an uncommon but frequently fatal complication, occurring in less than 1% of patients. Three-dimensional (3D) printing is widely used in medicine as a bridge between medical imaging and clinical aid and has gradually emerged in the field of cardiovascular diseases. The aim of this study was to develop a process for modelling and 3D printing of post myocardial VSR for procedural planning and simulation.

Methods

The data for 3D model production were acquired through Cardiac Helical CT. After image acquisition, the volumetric imaging datasets were imported in Mimics (Materialise) for image segmentation and conversion into 3D patient-specific digital model. The model was 3D printed with Formlabs 3B using a clear elastic resin (Formlabs Elastic 50A) by digital light processing photopolymerization (layer thickness 100 µm). Postprinting CT of the 3D model was performed for validation of the prints.

Results

In 3 prospectively included patients the complete heart including VSR were modelled and printed (**figure 1**). All models were created to scale, implying conservation of in vivo dimensions. Based on comorbidities and three-dimensional prints two patients were treated surgically and one patient was opted for a transcatheter approach. In the surgically treated patients the models were validated by in vivo comparison.

Conclusion

This report demonstrates our preliminary experience in creating a pathway for patient-specific 3D models in ventricular septal rupture. 3D models can enhance in pre-operative planning and help to determine the optimal closure strategy (transcatheter vs surgery). Future studies to verify the results are needed.

Figure 1



On the left: 3D printed ventricle septal rupture with fitting of a transcatheter plug. On the right a ventricle septal rupture treated surgically.

11.15 uur

ESSENTIAL SURGICAL PLAN MODIFICATIONS AFTER VIRTUAL REALITY PLANNING IN 50 CONSECUTIVE SEGMENTECTOMIES

Wouter Bakhuis^{1*}, Amir H. Sadeghi¹, Iris Moes¹, Alexander P.W.M. Maat¹, Sabrina Siregar¹, Ad J.J.C. Bogers¹, Edris A.F. Mahtab¹

¹Department of Cardiothoracic Surgery, Thoraxcenter, Erasmus University Medical Center, Rotterdam, The Netherlands. *presenting author

Objectives

Lately, increased interest in pulmonary segmentectomy has been observed. Segmental border identification is extremely difficult on 2-dimensional computed tomography (CT). Preoperative application of virtual reality (VR) can provide better insight into patient-specific anatomy. The aim of this study was to investigate the added clinical value of 3-dimensional (3D) VR using PulmoVR for preoperative planning.

Methods

Patients with an indication for pulmonary segmentectomy were included between June 2020 and September 2021 at the Erasmus Medical Center, Rotterdam, The Netherlands. CT scans were (semi)automatically segmented to visualize lung segments, segmental arteries, veins, and bronchi. Three surgeons made a surgical plan on the basis of the conventional CT scan and subsequently analyzed the VR visualization. The primary outcome was the incidence of critical (ensuring radical resection) preoperative plan modifications. Secondly, data on observed anatomic variation and perioperative (oncologic) outcomes were collected.

Results

A total of 50 patients with an indication for pulmonary segmentectomy were included. After supplemental VR visualization, the surgical plan was adjusted in 52%; the tumor was localized in a different segment in 14%, more lung-sparing resection was planned in 10%, and extended segmentectomy, including 1 lobectomy, was planned in 28%. Pathologic examination confirmed radical resection in 49 patients (98%).

Conclusion

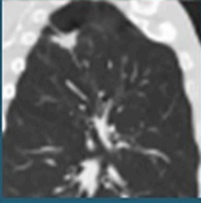
This 3D VR technology showed added clinical value in the first 50 VR-guided segmentectomies because a 52% change of plan with 98% radical resection was observed. Furthermore, 3D VR visualization of the bronchovascularity, including various anatomic variations, provided better insight into patient-specific anatomy and offered lung-sparing possibilities with more certainty.

Outcome of 3D-Virtual Reality (VR) Planned Segmentectomies

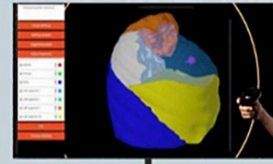
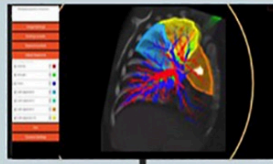
STUDY POPULATION

Fifty patients with indication for pulmonary segmentectomy

Erasmus MC, Rotterdam, The Netherlands →



Conventional CT + VR preoperative planning



52%

Change of surgical plan after addition of VR

98%

Pathological confirmation

11.30 uur

LEARNING CURVE OF THORACOSCOPIC, NON-ROBOTIC, HARVEST OF THE LEFT INTERNAL MAMMARY ARTERY IN ENDOSCOPIC CORONARY ARTERY BYPASS PROCEDURES

Ferdi Akca, Joost ter Woorst, Catharina Ziekenhuis Eindhoven

Objectives

Harvest of the left internal mammary artery (LIMA) is a technical demanding element of minimally invasive coronary surgery. We aimed to evaluate the learning curve of thoracoscopic, non-robotic, LIMA harvest during endoscopic coronary bypass (Endo-CAB) surgery.

Methods

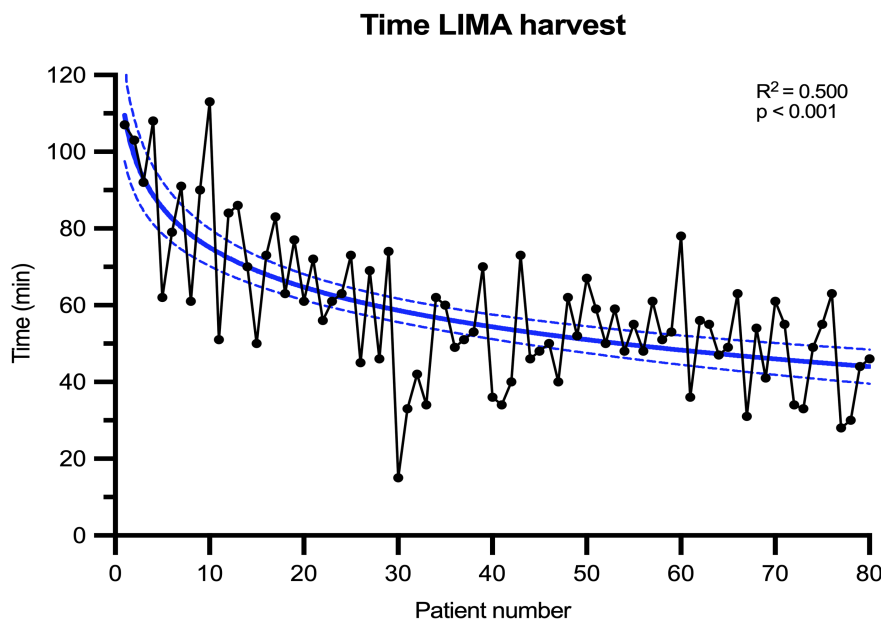
Eighty patients undergoing Endo-CAB surgery were included. LIMA harvest was performed using commonly available video-assisted thoracoscopic instruments. Time from incision until heparin administration was defined as total LIMA harvest time (this includes opening of the pericardium and identification of coronary targets). LIMA harvest times (n=80) and total procedure times for single vessel grafting (n=51) were analyzed.

Results

Mean LIMA harvest time was 58 ± 19 min, ranging from 15 to 113 min. The mean procedure time was 150 ± 39 min. Significant reduction of both LIMA harvest as total Endo-CAB procedure times were observed with increasing experience (logarithmic regression $Y=109-14,9*\log(x)$, $p<0.001$; $Y=227-24,4*\log(x)$, $p<0.001$, respectively). No damage to the LIMA occurred during thoracoscopic harvesting.

Conclusion

Total thoracoscopic (non-robotic) LIMA harvest is an efficient technique with a steep learning curve using routine instruments. More patients might benefit from minimally invasive coronary surgery using thoracoscopic LIMA harvest techniques.



11.45 uur

NEW ONSET, RECURRENCE AND PROGRESSION OF ATRIAL FIBRILLATION AFTER CARDIAC SURGERY DURING 2.5 YEARS OF CONTINUOUS RHYTHM MONITORING

Michal J. Kawczynski^{1,2,3}, Martijn D. Gilbers^{2,3}, Stef Zeemering^{2,3}, Aaron Isaacs^{2,3}, Jos G. Maessen^{1,3}, Sander Verheule^{2,3}, Elham Bidar^{1,3}, Ulrich Schotten^{2,3}

¹Department of Cardiothoracic Surgery, Heart and Vascular Centre Maastricht University Medical Centre, Maastricht, The Netherlands, ²Department of Physiology, Maastricht University, Maastricht, The Netherlands, ³Cardiovascular Research Institute Maastricht (CARIM), Maastricht, The Netherlands

Objective

Early-postoperative atrial fibrillation (POAF) is a frequent complication after cardiac surgery which is associated with late-POAF-recurrences. However, it is unknown how POAF-burden (percentage of time in AF) progresses after surgery. Therefore the objective of this study was to investigate POAF-burden progression and clinical factors associated with POAF-burden during 2.5 years of continuous rhythm monitoring after cardiac surgery.

Methods

Patients with and without history of AF undergoing cardiac surgery were included. Continuous rhythm monitoring was performed over a period of 2.5 years with an implantable loop recorder. POAF-burden progression was calculated as percentage of time in AF for different time intervals (early-POAF-burden: 0-3, and late-POAF-burden: 3-30 months).

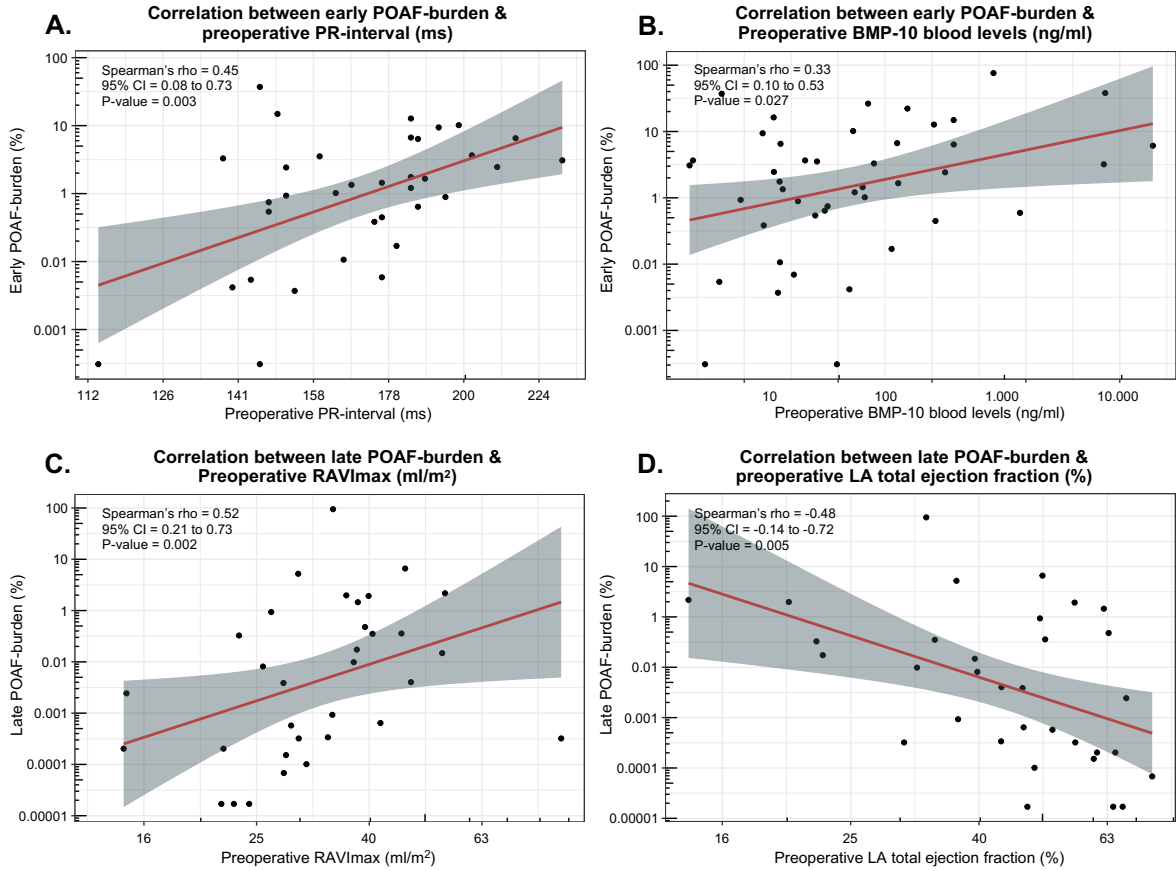
Results

The study population consisted of 98 patients of whom 45 had POAF. Early-POAF-burden was significantly higher as compared to late-POAF-burden ($p=0.007$). Increase in late-POAF-burden occurred in 14 patients and was significantly associated with greater number of electrical cardioversions, pulmonary vein ablations, and emergency rooms visits of any cause during the follow-up, as compared to patients who had no POAF or late-POAF-burden reduction. Early-POAF-burden was strongly associated with preoperative PR-interval, and with bone-morphogenic-peptide-10 (BMP-10) blood levels (Figure A & B). Late-POAF-burden was associated with increased right atrial maximum volume and reduced left atrial total ejection fraction (Figure C & D).

Conclusion

Patients developing POAF had the highest POAF-burden in the early postoperative phase. Increase in late-POAF-burden was associated with greater number of adverse events late after cardiac surgery. Also, increased right atrial volume and reduced left atrial ejection fraction were associated with increased late-POAF-burden.

Figure. Associations of preoperative clinical factors with early- and late-POAF-burden.



12.00 uur

A NOVEL APPROACH TO DEFINE THE OPTIMAL ANNUAL CASE VOLUME FOR CARDIOVASCULAR INTERVENTIONS IN NEED OF CENTRALIZATION

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Jos G. Maessen ^{1,2}, Elham Bidar ^{1,2}, Samuel Heuts ^{1,2}

¹ Department of Cardiothoracic Surgery, Maastricht University Medical Centre (MUMC+), Maastricht,

² Cardiovascular Research Institute Maastricht (CARIM), Maastricht University, Maastricht,

³ Department of Clinical Epidemiology and Medical Technology Assessment, Maastricht University Medical Centre (MUMC+), Maastricht, ⁴ Department of Cardiothoracic Surgery, Catharina Hospital Eindhoven, Eindhoven

Objectives

Annual hospital case volume is the main criterion for centralization. We propose a novel methodology to evaluate the volume-outcome relation for high-risk and infrequent procedures by a meta-analytical approach, using surgery for acute type A aortic dissection (ATAAD) as an example.

Methods

The primary outcome was early mortality in relation to annual hospital case volume. Secondary outcome was long-term survival. Data were compared in volume quartiles (Q's). Restricted cubic spline analysis was used to demonstrate the volume-outcome relation. We introduce the concept of the 'elbow-method' to determine optimal annual case volume (Figure). For long-term survival, individual patient data derived from Kaplan-Meier curves were integrated. For clinical interpretation, numbers needed to treat (NNT) were calculated.

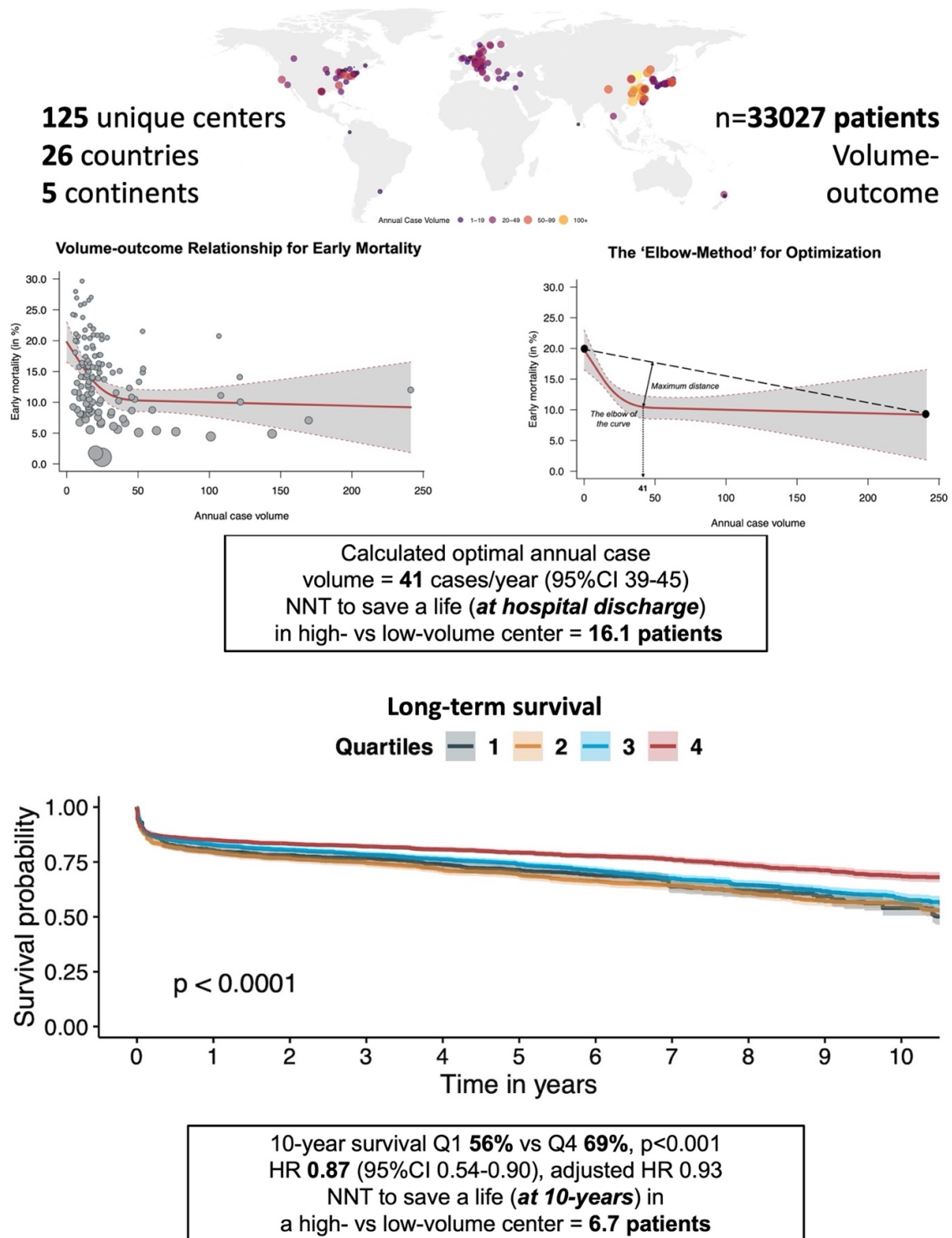
Results

125 studies from 125 unique centres were included, comprising 33 027 patients. A significant between-quartile difference for early mortality was observed (10.5% [Q4] vs. 16.8% [Q1], $p < 0.001$), persisting after correction for age, sex, and dissection type. A significant non-linear volume-outcome association was observed as well ($p < 0.001$, Figure). The optimal annual case volume after which results did not improve any further, was determined at 41 cases/year (95%CI 39-45, relative risk reduction 37.1%, NNT 16.1 compared to 10 cases/year, Figure). Even more pronounced between-quartile survival differences were observed for long-term survival (10-year survival Q4 69% vs Q1 56%, $p < 0.001$, HR=0.87, 95%CI=0.84-0.90, $p < 0.001$, NNT 6.7, Figure).

Conclusion

Using a novel approach, the optimal annual hospital ATAAD case volume threshold was statistically determined. This novel method has the potential to be applied to various other procedures requiring centralization.

FIGURE The volume-outcome association for ATAAD surgery in terms of early mortality and long-term survival.



ATAAD: acute type A aortic dissection, HR: hazard ratio, NNT: number needed to treat, Q: quartile.

12.15 – 12.45 uur

THE CREATION OF A CARDIAC BIOREACTOR - INTRODUCING THE REGMED XB CARDIOVASCULAR MOONSHOT

Mats T. Vervoorn¹, Selma E. Kaffka genaamd Dengler¹, Joost P.G. Sluijter^{2,3}, Pieter A. Doevendans^{4,5}, Niels P. Van der Kaaij¹.

¹*Department of Cardiothoracic Surgery. Universitair Medisch Centrum Utrecht, Utrecht,*

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Objectives

Heart failure is a growing global epidemic with limited possibilities for curative treatment. By creating a cardiac bioreactor, selective and isolated curative treatment of heart disease outside of the body (ex situ) becomes a possibility. We introduce the RegMed XB Cardiovascular Moonshot and discuss our steps towards creation of a cardiac bioreactor for curative treatment of heart disease and biological modification.

Methods

Static cold storage (SCS) was compared with hypothermic machine perfusion (HMP) for preservation of hearts up to 24 hours ex situ. The influence of hemofiltration and hemoadsorption on quality of normothermic machine perfusion (NMP) for heart preservation was also assessed; An optimized protocol for NMP was designed and initial steps towards extended NMP up to 12 hours were made. As a proof-of-concept, mRNA delivery to the heart using lipid nanoparticles was tested for biological modification.

Results

HMP was superior to SCS and possible up to 24 hours. Hemofiltration improved normothermic machine perfusion, while there was no clear benefit of hemoadsorption. Using an optimized perfusion protocol, superior preservation using NMP was achieved and extended up to 12 hours. successful delivery and translation of mRNA was achieved during 6 hours of NMP using lipid nanoparticles.

Conclusion

We demonstrated that it is possible to successfully preserve and biologically modify hearts up to 24 hours ex situ using a cardiac bioreactor. This opens up the possibility for selective and isolated treatment of heart disease and/oe biological modification of heart grafts to improve outcome after heart transplantation.

12.15 – 12.45 uur

AORTIC VALVE RECONSTRUCTION IN NONELDERLY ADULTS: A SYSTEMATIC REVIEW, META-ANALYSIS AND MICROSIMULATION STUDY

Maximiliaan L. Notenboom¹, Reda Rhellab¹, Kevin M. Veen¹, Jonathan R.G. Etnel¹, Yannick J.H.J. Taverne¹, Jolien W. Roos-Hesselink², Pieter C. van de Woestijne¹, Ad J.J.C Bogers¹, Jolanda Kluin¹, Johanna J.M. Takkenberg¹

¹Department of Cardiothoracic Surgery, Erasmus University Medical Center, Rotterdam, The Netherlands, ²Department of Cardiology, Division of Congenital Cardiology, Erasmus University Medical Center, Rotterdam, The Netherlands.

Objective

This study aims to provide a comprehensive overview of published outcome after aortic valve reconstruction (AVr) in nonelderly adults and to use microsimulation to obtain age-specific outcome estimates.

Methods

A systematic review of published literature reporting clinical outcome after AVr in nonelderly adults (mean age ≤ 55 y) published between 1/1/1990 and 17/10/2022 was conducted. Early risks (<30d), late event rates (>30d) and time-to-event data were pooled and entered into a microsimulation model. Subgroup analyses were performed for AVr for isolated AR and for bicuspid aortic valves (BAV).

Results

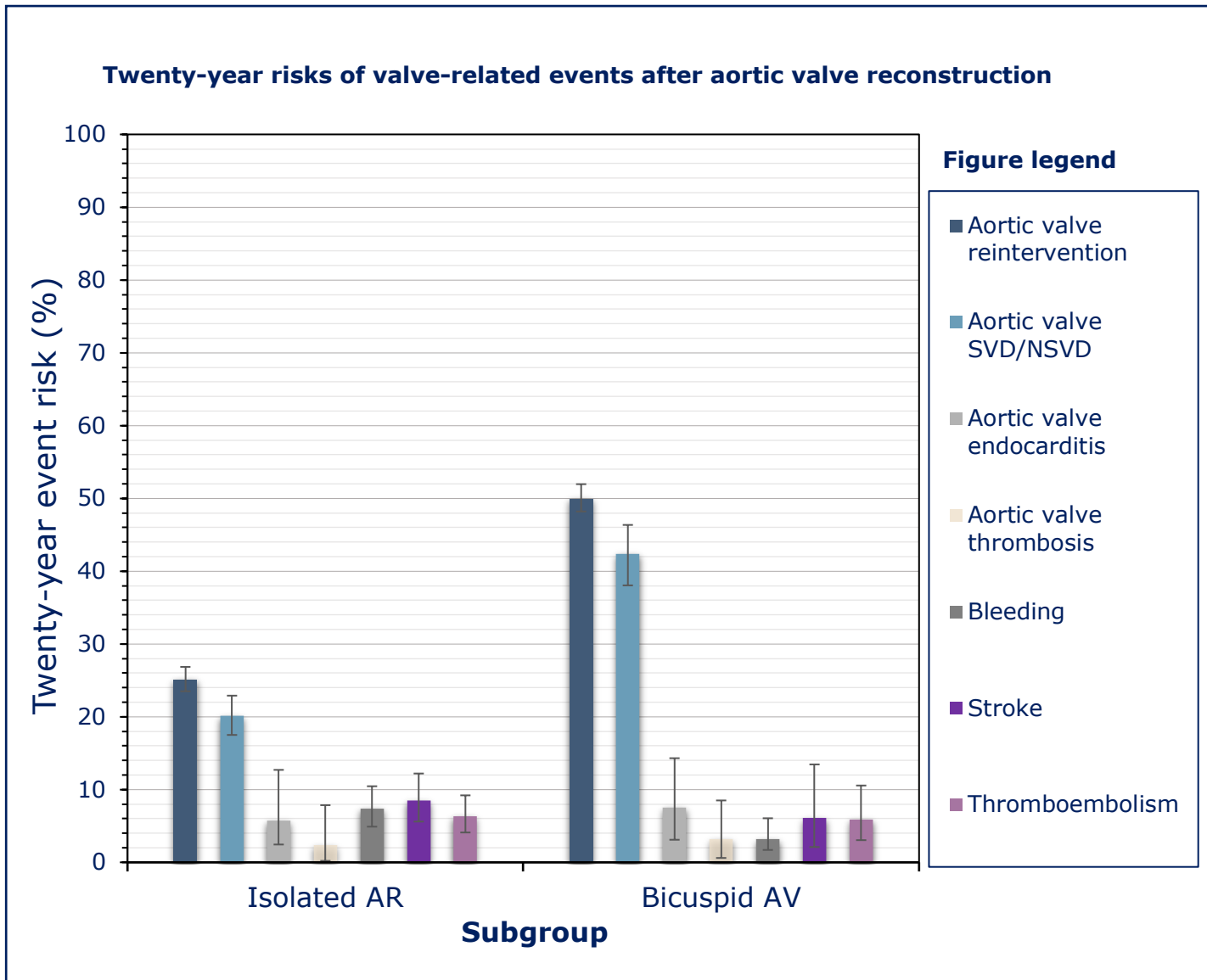
Thirty-seven retrospective cohort studies were included, yielding a total of 4,573 patients with 16,524 patient-years of follow-up (median follow-up: 4.0y; range 0.6-10.5y). Pooled mean age for all repairs, AVr for AR and AVr for BAV was 48.1 ± 13.8 , 48.3 ± 13.8 , and 42.4 ± 12.5 years, respectively. Pooled early mortality for all repairs, AVr for AR and AVr for BAV, respectively, was 1.7%(95%CI:1.2-2.3%), 1.5%(1.0-2.1%), and 1.0%(0.6-1.9%). Microsimulation-based life-expectancy relative to the general population 20 years postoperatively was 92.6%(95% Credible Interval:90.1-95.3%) after all repairs, 89.0%(85.0-93.0%) after AVr for isolated AR and 94.9%(92.0-97.4%) after AVr for BAV. Microsimulation-based twenty-year risk of aortic valve reintervention for all repairs, isolated AR and BAV, respectively, was 25.0%(23.8-26.2%), 25.1%(23.5-26.9%) and 49.9%(48.2-52.0%). Other valve-related complications occurred infrequently (Figure 1).

Conclusions

Aortic valve reconstruction for AR postpones valve replacement in nonelderly with satisfactory long-term outcomes but reintervention risks are considerable, especially in BAV patients. AVr is associated with low risks of bleeding and thrombo-embolic events and should be carefully weighed against hazards of primary aortic valve replacement.

Figures

Figure 1. Microsimulation-based twenty-year event risks of valve-related complications after AVr.



12.15 – 12.45 uur

CLAMSHELL VS. ANTEROLATERAL THORACOTOMY FOR BILATERAL LUNG TRANSPLANTATION: A SINGLE-CENTRE EXPERIENCE

Authors: Sanne J.J. Langmuur*^{1, 4}, Rogier A.S. Hoek*^{2, 4}, Leonard Seghers^{2, 4}, Jos A. Bekkers^{1, 4}, Özcan Birim^{1, 4}, Maarten ter Horst^{3, 4}, Edris A.F. Mahtab^{1, 4}

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Objectives

Clamshell incision is the routine approach in patients undergoing bilateral lung transplantation (LTx), despite the considerable morbidity related to this incision. The bilateral anterolateral thoracotomy without sternal division is proposed as an alternative, less invasive method. Since this technique is more surgically challenging, the aim of this study was to investigate what is the favourable surgical approach.

Methods

Adult patients undergoing LTx between 2010-2014 and 2017-2020 were included in this retrospective cohort study. Multivariable survival and regression analyses were performed and penalised with Ridge regression if necessary, to assess the effect of surgical approach on mortality, operative outcomes, and complications.

Results

164 patients (thoracotomy: n=72 vs. clamshell: n=92) were included for analysis. No baseline differences were found besides a higher median age, fewer recipients classified as highly urgent and less patients admitted to the hospital pre-transplantation in the thoracotomy group. After multivariable analysis, no differences in survival were found. Additionally, in the thoracotomy group, median ICU (5 (IQR: 3-12) vs. 12 (5-51) days) and hospital LOS (31 (23-40) vs. 47 (29-86) days) were shorter and rethoracotomy less frequent. However, median ischemic times were longer (423 (374-496) vs. 388 (341-419) min). No significant differences were found in perioperative blood loss or need for revision of bronchial anastomosis.

Conclusions

Bilateral anterolateral thoracotomy is a less invasive approach for operating patients undergoing bilateral LTx, which is favourable over the traditional clamshell incision, with comparable survival, shorter ICU and hospital LOS, and less rethoracotomies. However, ischemic times tend to be longer for this more surgically challenging approach.

12.15 – 12.45 uur

THE PREDICTIVE VALUE OF PREOPERATIVE PULMONARY FUNCTION ON POSTOPERATIVE PULMONARY COMPLICATIONS IN OPEN DESCENDING AND THORACOABDOMINAL AORTIC REPAIR.

Prushoth Sivapragasam, Wilson W.L. Li, Tim Somers, Michelle Smulders, Tim Smith, Guillaume S.C. Geuzebroek, Robin H. Heijmen, *Radboudumc, Nijmegen*

Objectives

To determine the predictive value of preoperative pulmonary function on postoperative pulmonary complications after open repair of descending thoracic aortic aneurysms (DTA) and thoracoabdominal aneurysms (TAAA), with specific emphasis on the significance of diffusing capacity of lung for carbon monoxide (DLCO).

Methods

All patients undergoing elective open repair for DTA or TAAA between 2013-2022 in our center were considered for this study. All patients with preoperative pulmonary function testing including DLCO measurements were included in the analysis. Patients were divided into three groups: normal DLCO (>80% of predicted), moderate reduction of DLCO (50-80% of predicted), and severe reduction of DLCO (<50% of predicted). Pulmonary complications was a composite endpoint including tracheostomy, prolonged ventilation, noninvasive ventilation, lung embolism, pneumothorax, pneumonia, chylothorax, and pleural effusion. Multivariate logistic regression analysis was performed to examine the influence of DLCO on the incidence of postoperative pulmonary complications.

Results

During the study period, 219 patients underwent open DTA or TAAA repair. Pulmonary function tests were available for 133 patients (60.7%) and 83 tests included DLCO. In-hospital mortality was 8.4%. Incidence of postoperative pulmonary complications was 23.5%, 36.4%, and 50.0% for patients with normal DLCO, moderate reduction, and severe reduction of DLCO respectively. In multivariate analysis, severe reduction of DLCO was independently associated with postoperative pulmonary complications (P=0.048), while forced expiratory volume in one second (FEV1) was not.

Conclusion

Preoperative DLCO <50% is greatly predictive of an increased risk of postoperative pulmonary complications after open DTA or TAAA repair.

12.15 – 12.45 uur

CONCOMITANT ANTERIOR MITRAL VALVE LEAFLET EXTENSION VERSUS ISOLATED SURGICAL SEPTAL MYECTOMY IN HYPERTROPHIC OBSTRUCTIVE CARDIOMYOPATHY

Tijn J.P. Heeringa^{1,2}, Marieke Hoogewerf³, Romy M. J. J. Hegeman⁴, Dimitri W. van Wylick¹, David Stecher^{1,5}, Maarten-Jan Cramer³, Giulia de Zan^{3,6}, Yvonne Koop², Ronald, C.A. Meijer¹, M. Guglielmo³, Niels P. van der Kaaij¹

¹Department of Cardiothoracic Surgery, University Medical Centre Utrecht, Utrecht, The Netherlands, ²Julius Centre for Health Sciences and Primary Care, Cardiovascular epidemiology, Utrecht Medical Centre Centre, Utrecht University, The Netherlands, ³Department of Cardiology, University Medical Centre Utrecht, Utrecht, The Netherlands, ⁴Department of Cardiothoracic Surgery, St. Antonius Hospital, Nieuwegein, The Netherlands, ⁵Department of Cardiothoracic Surgery, Medical Centre Leeuwarden, Leeuwarden, The Netherlands, ⁶Department of Translation Medicine, University of Eastern Piedmont, Maggiore Della Carità Hospital, Novara, Italy

Objectives

In patients with obstructive hypertrophic cardiomyopathy (HOCM), anterior mitral valve leaflet extension (AMLE) might further reduce left ventricular outflow tract (LVOT) obstruction, systolic anterior motion (SAM), and mitral valve regurgitation in addition to surgical septal myectomy (SSM) alone. In this study we evaluate differences in echocardiographic parameters and complication rates of SSM+AMLE versus isolated SSM for HOCM-patients.

Methods

In this observational cohort study we included HOCM-patients who underwent SSM+AMLE (2006-2015) and isolated SSM (2015-2020). The LVOT-gradient, SAM and MR were measured, and complication rates were described at 30-days and at three-year follow-up postoperative.

Results

A total of 60 patients (27 SSM, 33 SSM+AMLE) were enrolled. Preoperative echocardiographic measurements and outcome measurements are presented in table 1. Both procedures showed postoperative relief of LVOT obstruction (13 mmHg in SSM vs 14 mmHg SSM+AMLE), reduction of MR (mild or less; 96.3% vs. 93.9%) and SAM (2 (7.4%) vs. 0), but there was no statistically significant difference between both groups at 30-days and at three-year follow-up. At three-year follow-up, there were more reoperations in SSM+AMLE and a higher persistent LVOT-gradient postoperatively, but not statistically significant. Also 30-day complications showed no significant difference.

Conclusion

This study shows that both techniques are effective and safe in treating HOCM patients. Also, there is not enough evidence that AMLE procedure concomitant to SSM is of additional value in HOCM patients. This might indicate that both procedures are equally effective in this group of HOCM patients, but larger sample sizes are needed to confirm this.

Table 1. Echocardiographic parameters and complications.

	Preoperative			30 Days follow-up			Three-years follow-up		
	SSM N = 27	SSM+AMLE N = 33	p-value	SSM N = 27	SSM+AMLE N = 33	p-value	SSM N = 27	SSM+AMLE N = 33	p-value
Complications									
Mortality				0 (0)	0 (0)	-	0 (0)	0 (0)	-
Reoperations				1 (3.7)	1 (3.0)	0.885	1 (3.7)	3 (9.1)	0.497
VSD				0 (0)	1 (3.0)	1.000	-	-	-
New PM				1 (3.7)	5 (15.2)	0.209	0 (0)	0 (0)	-
New ICD				0 (0)	0 (0)	-	0 (0)	0 (0)	-
Stroke				0 (0)	0 (0)	-	-	-	-
MI				0 (0)	0 (0)	-	0 (0)	0 (0)	-
Echocardiography*									
LVOT-gradient, mmHg	90.6	72.8	0.027	N = 27	N = 33	0.676	N = 13	N = 28	0.990
(range)	(54-132)	(35-155)		(5-37)	(5-41)		(3-11)	(2-60)	
LVOT >30 mmHg	27 (100)	33 (100)		2 (7.4)	4 (12)	0.681	0	1 (3.6)	0.403
MR, mild or less	21 (77.8)	23 (69.7)	0.615	26 (96.3)	31 (93.9)	0.270	12 (92.3)	26 (92.9)	0.270
SAM	22 (81)	30 (90)	0.448	2 (7.4)	0	0.198	1 (7.6)	1 (3.6)	0.080

Data presented in count (%), or continuous value (range). Abbreviations: SSM, single septal myectomy; AMLE, anterior mitral valve leaflet extension; FUD, follow-up in days; VSD, ventricular septal defect; PM, pacemaker; ICD, internal defibrillation device; MI, myocardial infarction; LVOT, left ventricular outflow tract; MR, mitral valve regurgitation; SAM, systolic anterior movement; -, missing value. *Before hospital discharge and at three-years follow-up.

12.15 – 12.45 uur

VIRTUAL REALITY SIMULATOR VERSUS CONVENTIONAL ADVANCED LIFE SUPPORT TRAINING FOR RESUSCITATION POST-CARDIAC SURGERY: A RANDOMISED CONTROLLED TRIAL

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Objectives

This randomised controlled trial (RCT) compared the effectiveness of a Virtual Reality (VR) simulator training versus conventional classroom training in teaching the Cardiac Surgical Unit Advanced Life Support (CSU-ALS) protocol for patients arresting after cardiac surgery.

Methods

This RCT was conducted at the Dutch national cardiothoracic surgery residents' training day (NVT Juniorkamer trainingsdag) in May 2022, with 28 out of 40 eligible participants randomised to either the VR intervention group or the conventional classroom training group. After training, participants were assessed in a moulage scenario in groups of two. The primary outcomes were 1) the delivery of 3 stacked shocks within 1 minute and 2) resternotomy within 5 minutes. Secondary outcomes were the number of protocol mistakes made and a questionnaire about the VR simulator.

Results

Participants who underwent conventional training administered stacked shocks within 1 minute in 43% of cases, while none in the VR group reached this target. Both groups were significantly faster than the resternotomy time target, which was reached in 100% of cases in the control group and 83% in the VR group. The VR group made fewer mistakes (11) than the control group (15). Participants reported the VR simulator was useful and easy to use.

Conclusion

The study demonstrates that VR simulation can provide adequate CSU-ALS training and resulted in fewer mistakes. The results highlight the potential of VR training as an alternative or complementary method to conventional training. Future studies should combine both training modalities to ensure all trainees consistently reach both shock and resternotomy time targets.

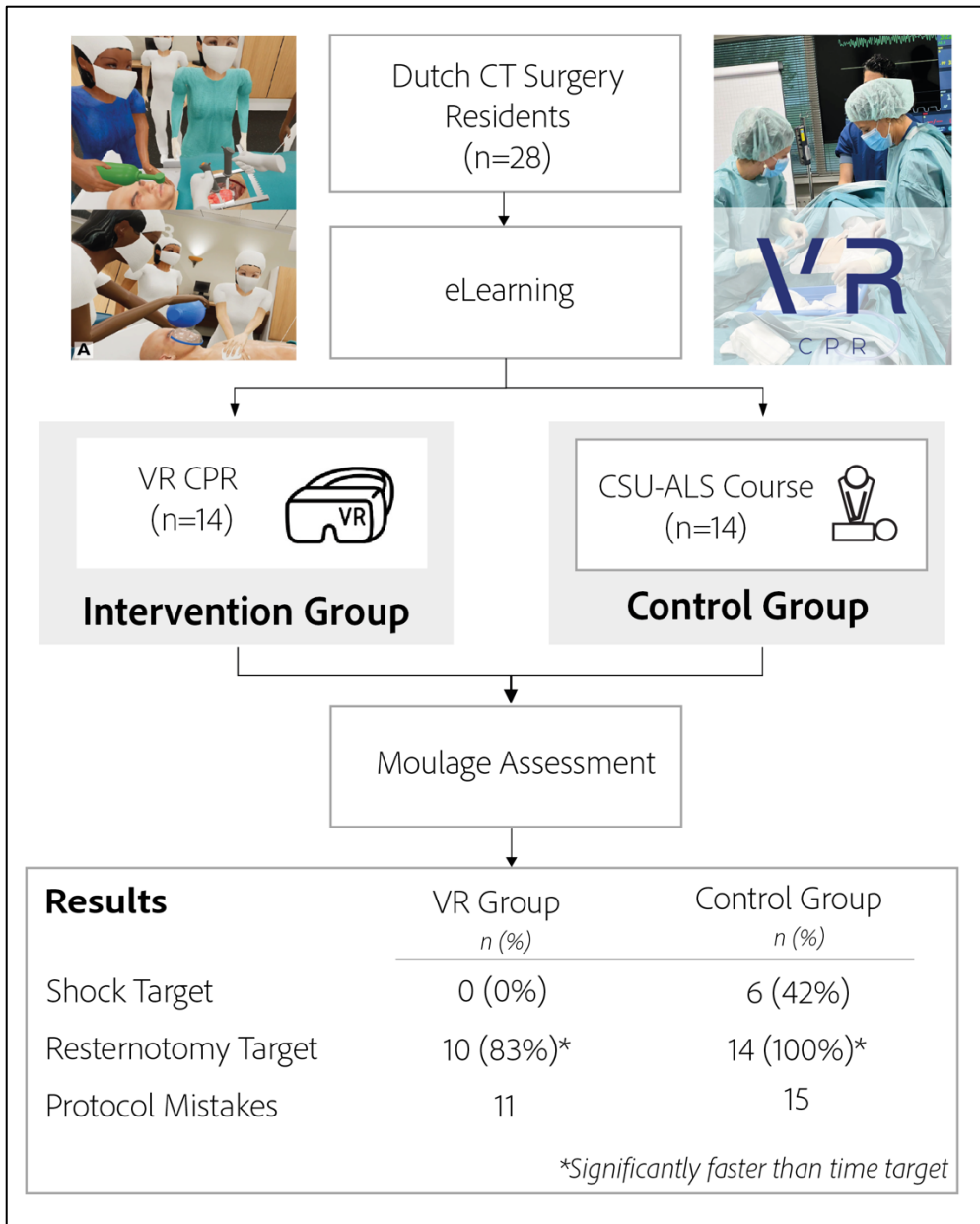


Figure 1 - Graphical Abstract showing the study design and primary outcomes of this randomised controlled trial.

16.00 uur

MINIMALLY INVASIVE MITRAL VALVE SURGERY COMPARED TO STERNOTOMY IN PATIENTS OVER 70 YEARS OLD: A RETROSPECTIVE NATIONWIDE MULTICENTER STUDY IN THE NETHERLANDS.

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Objectives

Increasing age is associated with increased morbidity and mortality in mitral valve (MV) surgery. Nowadays, minimally invasive MV surgery (MIMVS) is increasingly adopted worldwide, which might be an advantage in elderly. This study compares short- and mid-term outcomes of patients over 70 years old undergoing MIMVS versus median sternotomy (MST) in the Netherlands.

Methods

All patients over 70 years old undergoing primary elective MV surgery (\pm tricuspid valve (TV) surgery, ASD 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.

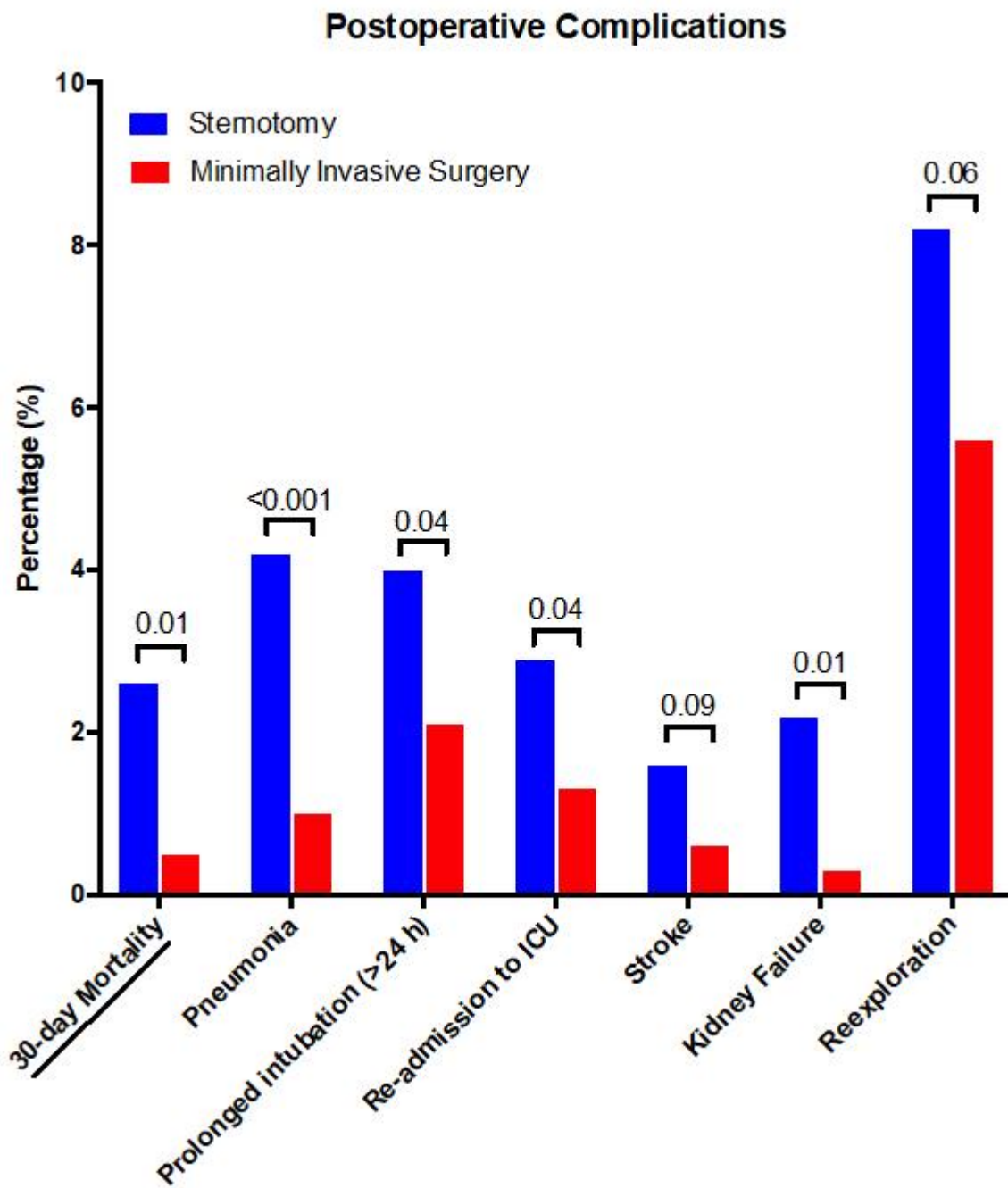
Results

In total, 1429 patients were included (MST n=805, MIMVS n=624). No significant difference in baseline characteristics (i.e. age, gender, comorbidities, LVEF and pulmonary artery pressures) were found. Median Logistic EuroSCORE I was 6.36 [4.70-8.53] vs. 5.99 [4.61-8.46] ($p=0.27$) for MST and MIMVS. Mitral valve repair (n=624, 77.5% vs n=402, 64.4%, $p<0.001$) and concomitant TV surgery (n=351, 43.6% vs n=113, 18.1%, $p<0.001$) was performed more frequently in MST. Lower 30-day mortality was observed in MIMVS (n=21, 2.6% vs n=4, 0.6%, $p=0.01$). Furthermore, the incidence of pneumonia, prolonged intubation, re-admission to ICU, kidney failure and new-onset arrhythmia were lower for MIMVS (Figure 1). No difference in 5-year survival was found (MST: $89.9 \pm 4.7\%$ vs MIMVS: $91.8 \pm 5.1\%$, Log-Rank $p=0.50$).

Conclusion

Minimally invasive MV surgery in patients over 70 years old is associated with lower 30-day mortality and incidence of postoperative complications compared to sternotomy. No difference in 5-year survival was observed.

Figure 1



16.15 uur

ELDERLY PATIENTS BENEFIT FROM MINIMALLY INVASIVE MITRAL VALVE SURGERY; PERIOPERATIVE RISK MANAGEMENT MATTERS

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Objectives

To assess single center results of minimally invasive mitral valve surgery (MIMVS) in elderly population.

Methods

All patients referred for minimally invasive valve surgery underwent a standardized preoperative screening. We performed a retrospective analysis of 131 consecutive elderly patients (≥ 75 years) who underwent endoscopic MIMVS through right mini-thoracotomy. Survival and postoperative course were assessed in two groups; a repair and a replacement group.

Results

Eighty-five patients underwent mitral valve repair and 46 mitral valve replacement. The mean age was 79 ± 2.9 years and median follow-up duration was 3.8 years. The cardiopulmonary bypass time (128.7 minutes vs. 155.9 minutes, $P = 0.012$) and cross-clamp time (84.9 minutes vs. 124.1 minutes, $P = 0.005$) were significantly longer in the replacement group. Beside more reinterventions for bleeding in the replacement group (10.9% vs. 0%, $P = 0.005$) there were no significant differences in the postoperative course between both groups. Low mortality rates in the midterm follow up were observed in both groups and no difference was observed between 4 and 12 months follow-up. Survival rates after 1 year and 5 years were 97.6% and 88.6%, respectively, without a significant difference between two groups.

Conclusions

MIMVS is an excellent treatment option in vulnerable elderly patients with excellent short and long-term results. Although other studies suggest that repair could be superior to replacement even in elderly patients, our experience suggests that replacement is equivalent to repair in terms of mortality and MACCE. Experience and standardized preoperative screening are mandatory to achieve optimal results.

16.30 uur

EARLY MITRAL VALVE REPAIR SURGERY VERSUS ACTIVE SURVEILLANCE IN PATIENTS WITH ASYMPTOMATIC SEVERE PRIMARY MITRAL REGURGITATION; INSIGHTS FROM THE DUTCH AMR REGISTRY

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Objectives

Management of asymptomatic patients with severe mitral regurgitation (MR) and preserved left ventricular function remains challenging. According to international guidelines, early mitral valve repair (MVR) surgery and active surveillance with facilitated surgery are both possible treatment strategies. In the multicenter Dutch AMR registry, asymptomatic MR patients were allocated to either strategy to compare both strategies.

Methods

Since 2013, 99 patients with severe primary MR were included from 5 medical centers. Treatment strategy was based on heart team decision. During follow-up, we assessed primary endpoints for both groups; occurrence of atrial fibrillation, cerebrovascular accident, heart failure, MVR surgery and cardiovascular/non-cardiovascular death. We particularly assessed the number and timing of patients that underwent facilitated surgery in the active surveillance group.

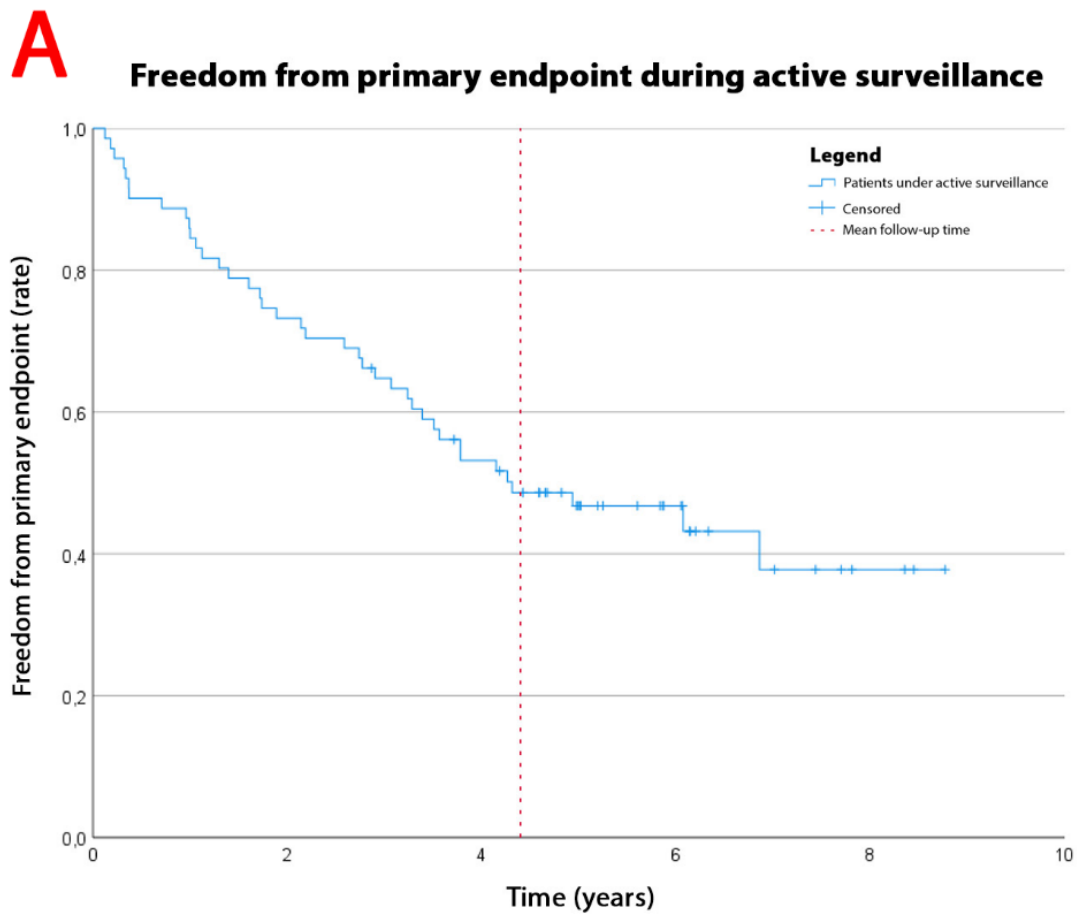
Results

71 Patients were allocated to the active surveillance and 28 to the early surgery group. 39 Patients in the active surveillance group reached a primary endpoint, including 2 cardiovascular and 1 non-cardiovascular death (**Figure 1A**). In the early surgery group, 4 patients reached a primary endpoint including 2 cardiovascular deaths. Over a mean follow-up time of 4.4 years, 51% of the active surveillance population underwent facilitated surgery due to either symptomatic or asymptomatic triggers (**Figure 1B**).

Conclusions

51% of MR patients under active surveillance needed facilitated surgery within 4.4 years. Approximately half of these patients were asymptomatic when developing an indication for surgery. These results show that active surveillance can be safely accomplished in selected asymptomatic MR patients since half of patients are still asymptomatic without guideline indications for surgery.

Figure 1. Freedom of primary endpoint during active surveillance (A) and reasons for facilitated surgery in the active surveillance group (B).



B

Reasons for facilitated surgery in the active surveillance group			
	Number of patients		Number of patients
Symptomatic	19	Asymptomatic	17
Dyspnea / fatigue	15	Atrial fibrillation	9
Heart failure	2	LV dilatation	3
Endocarditis	2	LA dilatation	2
		Patient's request	2
		Pulmonary hypertension	1

16.45 uur

PERSPECTIVES ON SHARED DECISION-MAKING IN THE TREATMENT OF NON-SMALL CELL LUNG CANCER STAGE I-IV: INSIGHTS FROM PATIENTS AND CLINICIANS

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Objectives

The study aims to explore the opinions of patients with non-small cell lung cancer (NSCLC) and clinicians involved in NSCLC treatment regarding shared decision making (SDM).

Methods

Two surveys were conducted; one among Dutch patients with NSCLC (n=116) and another among clinicians involved in NSCLC treatment (n=143). The clinicians reviewed 5 hypothetical cases using a 1-7 likert-type scale to indicate their preferred treatment strategy. Patients and clinicians were asked about information provision and barriers in SDM through the control preference scale.

Results

In three of the five hypothetical cases, the preference for a treatment strategy differed significantly among clinicians ($p < .01$) (see: figure 1). The majority of the patients and clinicians reported that the pulmonologist is the primary source of information (70% vs. 87%). However, about a quarter of the patients reported that the primary source was the internet (27% vs. 1%, $p < .001$). Patients reported more often than clinicians that the treatment information was not always consistent (41% vs. 23%, $p < .001$). The majority of both patient and clinicians indicate that the final decision for treatment should be made together (85% vs. 70%). However, 23% of the clinicians indicate that the final decision should be made by the patient (23% v. 6%, $p < .001$).

Conclusion

Patient preferences should play a decisive role in treatment decision-making. Better patient information provision is necessary to improve patients' involvement in SDM. The findings emphasize the need for a multidisciplinary approach to treatment decision-making, and for clinicians to work together to reach a consensus.

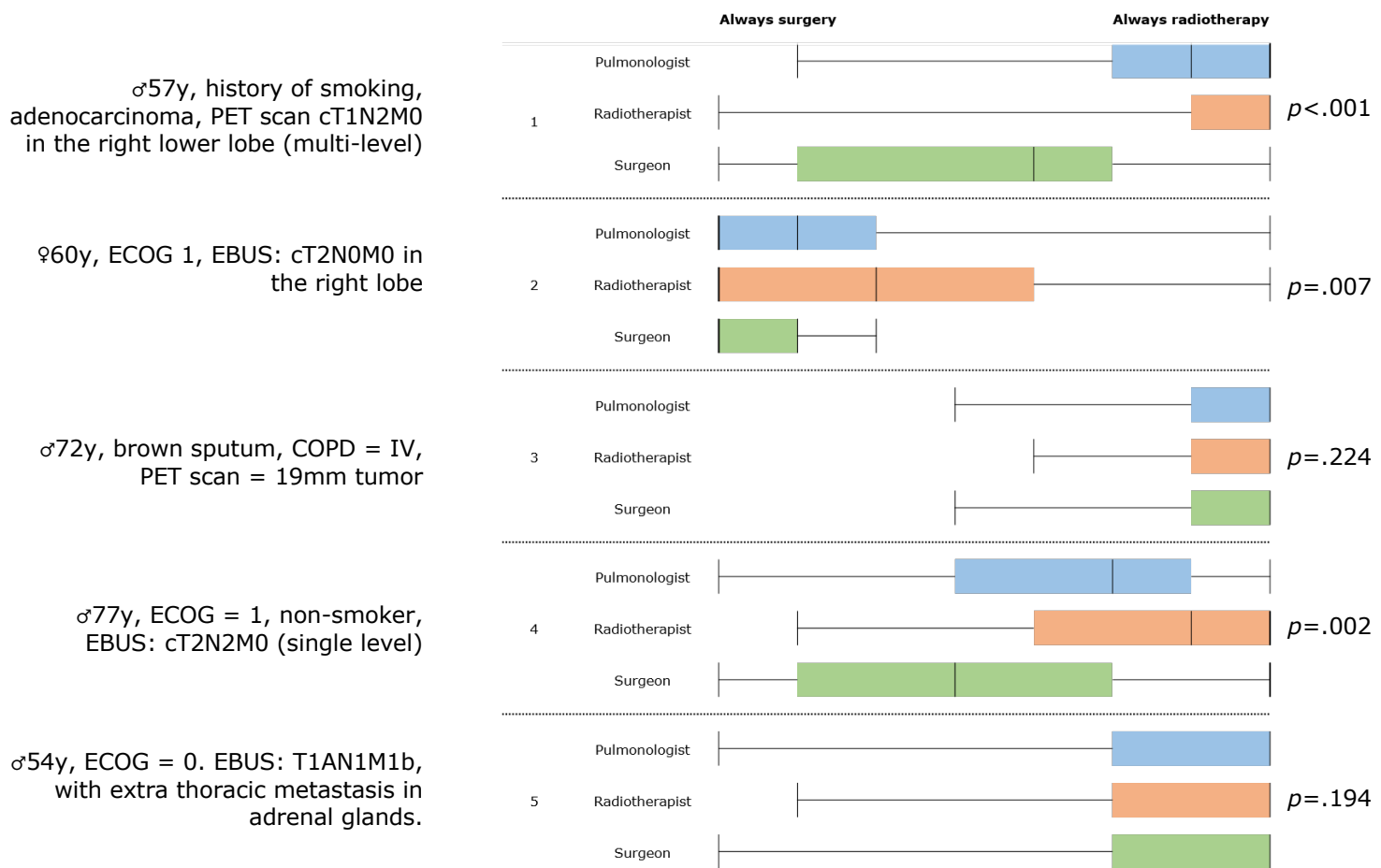


Figure 1: Clinicians' treatment strategy preference in five hypothetical cases. Box illustrates the median (50%) of the clinician's preference, and the whiskers show the minimum and maximum values.