Program

Second joint Annual Meeting

of the Belgian Association for Cardio-Thoracic Surgery and the Nederlandse Vereniging voor Thoraxchirurgie

November 15th-16th 2019

MECC Maastricht

The Netherlands

Dear friends,

It is my pleasure to welcome you to the second joint scientific meeting of the Belgian Association for Cardio-Thoracic Surgery and the Nederlandse Vereniging voor Thoraxchirurgie – on our way to a new tradition!

Based on the experience and reception of the first joint meeting (Antwerp 2017), the organizing committee decided to stay with a 2-days convention. For this year, the beautiful city of Maastricht will be the venue.

The abstracts that were sent for review were all rated by both societies, and the highest rated contributions will be presented in the scientific meeting on Friday 15 November per domain (Adult Cardiac, Congenital and Thoracic). We are convinced that this convention will be an inspiring setting for (young) investigators, and hope for lively interaction and discussion during the sessions. At the end of the day, prizes will be awarded for best abstract and best presentation.

The general assembly of the NVT will also take place on Friday 15 November, parallel to that of BACTS and the meetings for residents and allied healthcare professionals. Apart from science, the meeting will also offer a place to meet old friends – and make new. Friday evening can be spent at Kasteel de Hoogenweerth, where a walking dinner will be organized.

On Saturday 16 November, the societies for extracorporeal circulation/technology from both countries will join with our societies in a session that focuses on a theme where we all meet: ECMO/ECLS.

We look forward to meeting you in Maastricht!

Jerry Braun
President Nederlandse Vereniging voor Thoraxchirurgie

Dear colleagues and members,
Dear friends,

I have the pleasure to welcome you at this BACTS-NVT meeting 2019 in Maastricht, building further on the experience and tremendous meeting we held together with our colleagues of the Nederlandse Vereniging van Thoraxheelkunde in Antwerp two years ago.

We are again excited but confident that this meeting will be of outstanding quality, embracing the scientific strength of two societies, yielding excellent expertise on both domains of cardiac and thoracic surgery.

As last time in Antwerp, the format of the meeting as been adapted to a 2-day meeting, starting on Friday November 15th with the traditional plenary sessions, followed by a walking dinner at Kasteel de Hoogenweerth in Maastricht.

On Saturday November 16th in the morning, a session on ECMO has been organized, in collaboration with the Belgian Society of Extracorporal Technology and the Nederlandse Sociëteit voor ExtraCorporale Circulatie, highlighting extracorporal circulation from both the surgeon and perfusionist's perspectives.

To accommodate this meeting a location central to all societies has been chosen in Maastricht at the MECC.

Included in the program, at the end of the Friday morning session, the BACTS General Assembly will be organized, with this year the election of a new BACTS Board for the coming four years.

On behalf of the BACTS, I hope that you all warmly receive these initiatives and respond unanimously by being largely present at the meeting, by affording scientific contributions and by offering some of your time and expertise, to the advantage of our professional organization.

Best regards
Philippe Nafteux
President 2018-2019

Floorplan

Congress Venue: Euro Centre

Main Congress Room: Florin & Euro
Break- out Room 2: Dollar
Break- out Room 3: Yen

Exhibition area (Millennium Foyer + annex)

Our Partners

1. Getinge Nederland NV
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With thanks to our Partners:

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Getinge Nederland nv

KM Innovations bv

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Transonic Europe

Program

Friday 15th November 2019

	Florin & Euro Room	Room: Yen (3)	Room: Dollar (2)
08:00	Registration		
08:30	Congenital Cardiac Session		
10:15	Coffee Break - Millennium Foyer & annex		
10:45	Adult Cardiac Session		
11:30			
12:00	General Assembly NVT	General Assembly BACTS	Alternative programme 'juniorkamer', NP's and PA's and all interested
13:00	Lunch in the Millennium Foyer & annex		
14:00	Thoracic Session		
15:00	Coffee Break - Millennium Foyer & annex		
15:30	Adult Cardiac Session		
17:00	Awards Session		
19:00	Congress Dinner		

Saturday 16th November 2019

09:00	Registration
	Florin & Euro Room
09:30	E.C.M.O. in Cardio-Thoracale Surgery
	Antocoagulation strategy on E.C.L.S.
	Update on Post-cardiotomy ECLS in Adult Patients
	E.C.M.O. In Longtransplantation
10:30	Coffee Break in the Millennium Foyer & annex
11:00	Cannulation Strategies in E.C.L.S.
	The view of the Perfusionist's
	The view of the Surgeon's
12:00	Session closure
13:00	Small Lunch followed by the Speed dating with industrie and members NeSECC / BelSECT

Programme

Friday 15th November 2019

08:00 Registration

08:30 Introduction chairmen BACTS-NVT

Congenital cardiac session

Moderators: Ryan Accord, UMCG Groningen - Alain Poncelet, UCL Bruxelles

08:45 The pulmonary autograft after the Ross and Ross-Konno operation: results from 25-year's follow-up.
T. Bové[1], N. Bradt[1], T. Martens[1], K. François[1], M. Peers de Nieuwburg[2], G. de Beco[2], J. Rubay[2], A. Poncelet[2] (Gent[1], Louvain-en-Woluwe[2], B)

08:57 Mechano-biological adaptation of the pulmonary artery exposed to systemic conditions.
E. Vanderveken, J. Vastmans, P. Claus, E. Verbeken, L. Van Hoof, K. Vandendriessche, P. Verbrugghe, H. Fehervary, N. Famaey, F. Rega (Leuven, B)

09:09 Evaluation of the mode of failure in fontan patients with an extracardiac total cavopulmonary connection.
J. Van Puyvelde, F. Rega, W. Budts, B. Cools, M. Gewillig, B. Meyns (Leuven, B)

09:21 Mitral valve replacement with the 15-MM mechanical mitral valve in infants: a 20-year multi-center experience.
R. J. IJsselhof[1], M. G. Slieker[1], M. G. Hazekamp[2], R. Accord[3], H. van Wetten[4], F. Haas[1], P. H. Schoof[1] (Utrecht[1], Leiden[2], Groningen[3], Nijmegen[4], NL)

9:33 Follow-up after biventricular repair of the hypoplastic left heart complex.
R. J. IJsselhof[1], S. D. R. Duchateau[1], R. M. Schouten[1], M. W. Freund[2], J. Heuser[3], Z. Fejzic[4], F. Haas[1], P. H. Schoof[1], M. G. Slieker[1] (Utrecht[1], Oldenburg[2], D, Veldhoven[3], Nijmegem[4], NL)

9:45 Truncus arteriosus repair without RV-PA valve.
W. Bakhuis, N. A. Korsuize, A. van Wijk, H. B. Grotenhuis, F. Haas, P. H. Schoof (Utrecht, NL)

10:15 Coffee break

Adult cardiac session

Moderators: Suzanne Kats, MUMC Maastricht - Steven Laga, UZA Antwerpen

10:45 Evaluating the diagnostic accuracy of aortic diameter, length and volume for prediction of aortic dissection.
S. Heuts[1], B.P. Adriaans[1], B. Rylski[2], C. Mihl[1], S.C.A.M. Bekkers[1], J.R. Olsthoorn[1,3], E. Natour[1,4], M. Berezowski[2,5], K. Koriosowska[5], H.J. Bouman[1], H.J.G.M. Crijns[1], J.G. Maessen[1], J.E. Wildberger[1], S. Schalla[1], P. Sardari Nia[1] (Maastricht[1], NL, Freiburg[2], D, Eindhoven[3], NL, Aachen[4], D, Wroclaw[5], PL)

10:57 Long-term outcomes after bicuspid aortic valve repair: comparison between two annuloplasty strategies.
L. de Kerchove, S. Tamer, S. Mastrobuoni, P. Noirhomme, P. Astarci, G. El Khoury (Louvain-en-Woluwe, B)

11:09 Treatment of extensive aortic valve endocarditis with the freestyle bioprosthesis, a midterm evaluation.
Y. Regragui, L. Van Hoof, P. Herijgers, W. Oosterlinck, M.-C. Herregods, B. Meuris, P. Verbrugghe (Leuven, B)

11:21 Improved quality of life after aortic valve replacement: impact of the minimally invasive approach.
C.D. de Roest, K.Y. Lam, S. Houterman, A.H.M. van Straten, M.A. Soliman-Hamad (Eindhoven (NL)

11:33 Long-term experience with valve-sparing root reimplantation surgery in tricuspid aortic valve.
S. Tamer, S. Mastrobuoni, G. Aphram, P. Noirhomme, P. Astarci, G. El Khoury, L. de Kerchove (Louvain-en-Woluwe, B)

11:45 Minimally invasive mitral valve surgery after previous sternotomy without aortic clamping: short and longterm results of a single surgeon single institution.
K. Ko, T.L. de Kroon, B.P. van Putte, N. Saouti (Nieuwegein, NL)

12:00 General Assembly NVT
General Assembly and report Database Committee BACTS

13:00 Lunch

Thoracic session

Moderators: Ad Verhagen UMCN Maastricht -
Rodolphe Durieux, CHU Liège

14:00 Completeness of lymph node dissection in patients undergoing minimally invasive- or open surgery for non-small cell lung cancer: a nationwide study.
L. van der Woude[1,2], M.W.J.M. Wouters[2,3], K.J. Hartemink[3], D.J. Heineman[3], A.F.T.M. Verhagen[1] (Nijmegen[1], Leiden[2], Amsterdam[3], NL)

14:12 The effect of DPP4 inhibition on lung ischemia-reperfusion injury in a mouse model.
L. Berzenji, A. Coquilhat, L. Van Tol, J. Hendriks, P. Van Schil (Antwerpen, B)

14:24 Pneumonectomy for lung cancer: a slippery slope?
L. Berzenji, J. Hendrik, S.K. Yogeswaran, P. Lauwers, P. Van Schil (Antwerpen, B)

14:36 20 years of pulmonary endarterectomy in UZ Leuven.
T. Verbelen, R. Quarck, C. Belge, L. Godinas, G. Maleux, M. Delcroix, B. Meyns (Leuven, B)

14:48 Heart donation from donors after circulatory death using normothermic regional perfusion.
D. Ledoux[1], V. Tchana-Sato[1], K. Vandendriessche[2], S. Rex[2], J. Van Cleemput[2], B. Cools[2], B. Meyns[2], F. Rega[2], G. Hans[1], P. Massion[1], J.-O. Defraigne[1] (Liège[1], Leuven[2], B)

15:00 Coffee break

Adult cardiac session

Moderators: Bart Maesen, MUMC Maastricht - Tinne Philipsen, UZ Gent

15:30 Clinical and echocardiographic results of complex tricuspid regurgitation repair.
M. Pettinari, S. Deferm, P. Bertrand, C. Van Kerrebroeck, R. Dion, H. Gutermann (Genk, B)

15:42 Does endomysial fibrosis play a role in the occurrence of post-operative atrial fibrillation?
R.M.R. Abrahams[1], S. Verheulem[1], J. Manghelli[2], J. Winters[1], S. van Seggelen[1], B. Scaf[1], A. van Hunnik[1], M. Gilbers[1], J.G. Maessen[1], U. Schotten[1], S. Melby[2], B. Maesen[1] (Maastricht[1], NL, St-Louis[2], USA)

15:54 Real life wide adoption of minimally invasive mitral valve surgery. A retrospective analysis of the OLVG experience.
S. Özturk, T. Plonek, R. Cocchieri (Amsterdam, NL)

16:06 A novel in vitro flow model for testing mechanical heart valve anticoagulant therapies: proof of concept.
M. Devos[1], L.M. de Heer[2], O.C.D. Liesdek[3], W.J.L. Suyker[3], S. Van Tuijl[1], M.C.M. Rutten[1] (Eindhoven[1], Leiden[2], Utrecht[3], NL)

16:18 Right ventricle evaluation by cardiac magnetic resonance before and after mitral valve surgery.
M. Pettinari[1], L. Siham[2], L. De Kerchove[2], A. Pasquet[2], B. Gerber[2], J.-L. Vanoverschelde[2], G. El-Khoury[2] (Genk[1], Louvain-en-Woluwe[2], B)

16:30 Port-access mitral and tricuspid surgery improves short and long term outcome after previous cabg.
K. Salhiyyah, M. Boeykens Y. Vermeulen, B. Stockman, F. Casselman, R. Beelen, F. Van Praet (Aalst, B)

16:42 Long-term follow-up of thoracoscopic ablation for long-standing persistent atrial fibrillation: continuous vs interval rhythm monitoring.
N. Harlaar[1], M.A.P. Oudeman[2], S.A. Trines[1], G.S. de Ruiter[2], M. Khan[2], K. Zeppenfeld[1], A. Tjon[2], T.J. van Brakel[1], J. Braun[1] (Leiden[1], Amsterdam[2], NL)

17:00 **Awards Session**
One prize will be handed over the best abstract and one for the best presentation.

19:00 Dinner

Saturday 16th November 2019

09:00 Registration

09:30 **E.C.M.O. in Cardio - Thoracic Surgery**

Moderators: Korneel Vandewiele, BelSECT &.....

Antocoagulation strategy on E.C.L.S.
Prof Filip De Somer
UZ Gent

Update on Post-cardiotomy ECLS in Adult Patients
Prof. Roberto Lorusso
MUMC+ Maastricht

E.C.M.O. in Longtransplantation
Prof. Georgie Lang
University Hospital Vienna

10:30 Coffee Break

11:00 **Cannulation Strategies in ECLS**

Moderators: Peter van den Barselaar, NeSECC & ....

Cannulation strategy in ECLS , the Prefusionist's view
Michel de Jong EKP; ECCP
UMC Utrecht

Cannulation strategy in ECLS , the Surgeon's view
Prof. Steven Jacobs
UZ Leuven

12:15 End of NVT-BACTS meeting and walking lunch

13:30 **NeSECC & BelSECT: Speeddate with the Industry**

Ne.S.E.C.C Nederlandse Société voor ExtraCorporale Circulatie
BelSECT BELGIAN SOCIETY OF EXTRACORPOREAL TECHNOLOGY

15:30 Closing remarks followed by drink and discussion

16:30 End.

Abstracts:

THE PULMONARY AUTOGRAFT AFTER THE ROSS AND ROSS-KONNO OPERATION: RESULTS FROM 25-YEAR'S FOLLOW-UP

T. Bové[1], N. Bradt[1], T. Martens[1], K. François[1], M. Peers de Nieuwburg[2], G. de Beco[2], J. Rubay[2], A. Poncelet[2]
U.Z. Gent, Gent[1], Cliniques Universitaires St-Luc, Louvain-en-Woluwe[2], Belgium

To analyze the clinical outcome after the Ross/Ross-Konno operation, and to investigate the longitudinal evolution of pulmonary autograft dimensions.

The Ross/Ross-Konno procedure is proposed as the best solution to treat complex aortic valve disease with/without associated LVOTO in children and adolescents. However, long-term concerns are related to aortic root dilation and need for late autograft reoperation.

From November 1991 to April 2019, 141 patients underwent a Ross/Ross-Konno procedure at the University Hospitals of UCL-St Luc and Ghent. Inclusion was based on age < 18 years and pulmonary autograft implantation by root replacement technique. Outcome focused on long-term survival, autograft function and freedom from reoperation, as well as autograft size evolution through linear mixed model analysis.

A Ross/Ross-Konno procedure was performed in 114(91%) and 27(19%) patients at a median age was 8.2y(IQR 2.9-13.6). Associated cardiac disease was present in 34%, mainly consisting of sub- or supra-aortic LVOTO. Global survival was 87±3% and 86±3% at 10 and 20 years. Freedom from autograft reoperation was 95±2% and 77±6% at 10-20 years for respectively aortic regurgitation(n=2) and aortic root dilation(n=11). Autograft size measurements showed a significant z-value increase per year at the level of root sinus and sinotubular junction (STJ) compared to the annulus (Annulus: 0.05±0.38 - Sinus: 0.17±0.25 – STJ: 0.13±0.34 – p=0.042). Linear mixed model analysis revealed a higher variability of z- value evolution for Ross-Konno compared to Ross patients (Annulus: p=0.042 – Sinus: p<0.001 – STJ: p=0.027), and for associated aortic arch reconstruction (Annulus: p=0.014 – Sinus: p<0.001 – STJ: p=0.012).

The Ross procedure is a reliable operation for children and adolescents with aortic valve disease, unless other complex LVOTO requires early correction. Compared to the stable evolution of the autograft at the annular level, the evolution at the root sinus and sinotubular junction is of greater concern. More data for Ross-Konno patients in the second decade after surgery are mandatory to confirm the accelerated tendency of autograft dilation, especially when compromised by aortic stiffening due to previous aortic arch repair.

MECHANO-BIOLOGICAL ADAPTATION OF THE PULMONARY ARTERY EXPOSED TO SYSTEMIC CONDITIONS

E. Vanderveken, J. Vastmans, P. Claus, E. Verbeken, L. Van Hoof, K. Vandendriessche, P. Verbrugghe, H. Fehervary, N. Famaey, F. Rega
U.Z. Gasthuisberg, Leuven, Belgium

The goal of this study was to assess the remodelling of the pulmonary artery as a response to a changed mechanical environment.

Various surgical interventions result in the exposure of the pulmonary artery to aortic conditions. Often, failure of these procedures is related to the inability of the pulmonary artery to adapt to the systemic conditions. Many efforts are undertaken to model the processes that take place during this adaptation. However, experimental data evaluating what happens both on a mechanical and histological level is lacking.

In 17 sheep, we placed a pulmonary autograft in aortic position, with or without macroporous mesh reinforcement. It was exposed to systemic conditions for 6 months. All sheep underwent 3 ECG-gated MRI's. Explanted tissue was subjected to mechanical (planar biaxial testing for stiffness and nonlinear stiffening and uniaxial testing for tissue strength) and histological analysis (quantication of collagen, elastin and SMC).

Results showed progressive dilatation of the unreinforced autograft, while reinforced autografts appeared to stabilize after two months. Several unreinforced pulmonary autograft samples displayed aorta-like mechanical behaviour, whereas some samples were not able to adapt to the new environment and remained mechanically similar to native pulmonary artery. The mechanical behaviour of reinforced autografts was dominated by the mesh. On a microstructural level, it was clear that the pulmonary artery adapted to the new environment by increasing collagen deposition. However, atrophy of smooth muscle cells and a decrease in media thickness also occurred.

In conclusion, altering the mechanical environment of a pulmonary artery causes changes in its mechano-biological properties. This study documents the observed phenomena visually, mechanically and histologically.

EVALUATION OF THE MODE OF FAILURE IN FONTAN PATIENTS WITH AN EXTRACARDIAC TOTAL CAVOPULMONARY CONNECTION

J. van Puyvelde, F. Rega, W. Budts, B. Cools, M. Gewillig, B. Meyns
U.Z. Gasthuisberg, Leuven, Belgium

The extracardiac total cavopulmonary connection (ECC TCPC) Fontan circulation has shown excellent results. However, it is known that even Fontan patients with an ECC TCPC can fail. Studies investigating the reasons for ECC TCPC Fontan failure are lacking. This led us to investigate the incidence, timing and mode of failure in patients with an ECC TCPC.

Single centre (UZ Leuven) retrospective review of the electronic records of all patients with an ECC TCPC between 1997 and 2017.

Fontan failure was defined as death, cardiac transplantation, protein-losing enteropathy or functioning in NYHA class 3 or 4. The mode of failure was defined as Fontan pathway obstruction, AV valve dysfunction, pulmonary vascular remodelling, systolic failure or restrictive physiology of the systemic ventricle.

178 patients received an ECC TCPC between 1997 and 2017, of which 62% had a systemic left ventricle. 27% of these patients where patients with tricuspid atresia, 17% had a double inlet left ventricle, 14% where patients with a double outlet right ventricle and 10% where hypoplastic left heart patients. The mean age at Fontan completion was 6 years and about 80% received a fenestration. The mean follow-up of 7.3 years. 13 patients developed Fontan failure (7.3%): there were 4 deaths (2.2%), 3 patients underwent cardiac transplantation (1.7%) and 6 patients developed protein-losing enteropathy (3.4%). Freedom from Fontan failure was 95% at 5 years and 85% at 10 years. The mode of failure of the Fontan circulation was determined to be due to Fontan pathway obstruction in one patient (8%), systolic dysfunction in 4 patients (31%), restrictive physiology of the systemic ventricle in 6 patients (46%) and pulmonary vascular remodelling in one patient (8%). All failing systemic left ventricles had a restrictive physiology.

Freedom from failure in the middle-long term ECC TCPC is excellent. There are 2 major modes of failure; systolic dysfunction or restrictive physiology of the systemic ventricle. We might consider a different strategy in timing of Fontan completion or fenestration management to prevent the development of a restrictive physiology in LV Fontan patients.

MITRAL VALVE REPLACEMENT WITH THE 15-MM MECHANICAL MITRAL VALVE IN INFANTS: A 20-YEAR MULTI-CENTER EXPERIENCE

R.J. IJsselhof[1], M.G. Slieker[1], M.G. Hazekamp[2], R. Accord[3], H. van Wetten[4], F. Haas[1], P.H. Schoof[1]
University Medical Centre Utrecht, Utrecht[1], Leiden University Medical Centre, Leiden[2], University Medical Centre Groningen[3], Groningen, Radboud University Medical Centre, Nijmegen[4], The Netherlands

The aim of this study was to evaluate early and long-term outcomes (mortality and prosthetic valve replacement) after mitral valve replacement with the 15-mm St. Jude Medical (SJM) prosthesis.

A multicentre, retrospective cohort study was performed among patients who underwent mitral valve replacement with a 15-mm SJM prosthesis at 4 congenital cardiac centres in The Netherlands. Operative results were evaluated, and echocardiographic data were studied at 0.5, 1, 2, 3, 5 and 10 years after surgery.

Surgery was performed in 17 infants. Ten patients (59%) were treated on the ICU prior to surgery and 8 (47%) of them were on ventilator support. Median age at surgery was 3.2 (IQR 1.2 – 5.6) months, median weight was 5.2 (IQR 3.9 – 5.7) kg. There was 1 early cardiac death and 1 late non-cardiac death. Median follow-up time was 9.6 (IQR 2.4 – 13.2) years including 8 patients with follow-up > 10 years. First prosthetic valve explantation (n=11) occurred at median time of 2.9 (IQR 2.0 – 5.4) years. Other reinterventions were permanent pacemaker implantation (n=3), subaortic stenosis resection (n=2) and paravalvular leak repair (n=1). Prosthetic valve gradients increased from a mean of 5.0 (at discharge) to a mean of 14.3 (at 5 years follow-up) mm Hg.

Mitral valve replacement with the 15-mm prosthesis can safely be performed in infants and even in neonates. Median freedom from prosthesis replacement for outgrowth is 3.5 years. Thromboembolic complications were rare.

FOLLOW-UP AFTER BIVENTRICULAR REPAIR OF THE HYPOPLASTIC LEFT HEART COMPLEX

R.J. IJsselhof[1], S.D.R. Duchateau[1], R.M. Schouten[1], M.W. Freund[2], J. Heuser[3], Z. Fejzic[4], F. Haas[1], P.H. Schoof[1], M.G. Slieker[1]
University Medical Centre Utrecht, Utrecht[1], Netherlands, University Pediatric Hospital, Oldenburg[2], Germany, Maxima Medical Centre Veldhoven, Veldhoven[3], The Netherlands, Radboud University Medical Centre, Nijmegen[4], The Netherlands

In hypoplastic left heart complex (HLHC) patients biventricular repair is preferred over staged-single ventricle palliation, but the number of studies is too small to support either strategy. We retrospectively characterized our patient cohort with HLHC after biventricular repair to measure left-sided heart structures and assess our treatment strategy.

Patients with HLHC who had biventricular repair between 2004 and 2018 were retrospectively reviewed. Operative results were evaluated and echocardiographic mitral valve (MV) and aortic valve (AoV) dimensions, left ventricular (LV) length and internal diastolic diameter (LVIDd) were measured preoperatively and during follow-up after 0.5, 1, 3, 5 and 10 years.

In 32 patients, median age at surgery was 10 (IQR 8.0 - 13.0) days. Median follow-up was 6.19 (IQR 4.12 - 10.16) years. During 10-year follow-up mean Z-scores increased from -2.82 to -1.49 and from -2.29 to 0.62 for MV and AoV respectively. Growth of left-sided heart structures was accelerated in the first year after repair, but was not equal, with the MV lagging behind the AoV ($p=0.03$), resulting in significantly smaller MV Z-scores compared to AoV Z-scores at 10-year follow-up ($p<0.001$). There were 2 (6%) early deaths. Major adverse events occurred in 4 (13%) patients. Surgical or catheter-based reintervention was required in 14 (44%) patients.

Most of the growth of left-sided heart structures occurred in the first year after biventricular repair, with less growth of the MV compared to the AoV. In selected HLHC patients biventricular repair can be performed with good results.

TRUNCUS ARTERIOSUS REPAIR WITHOUT RV-PA VALVE

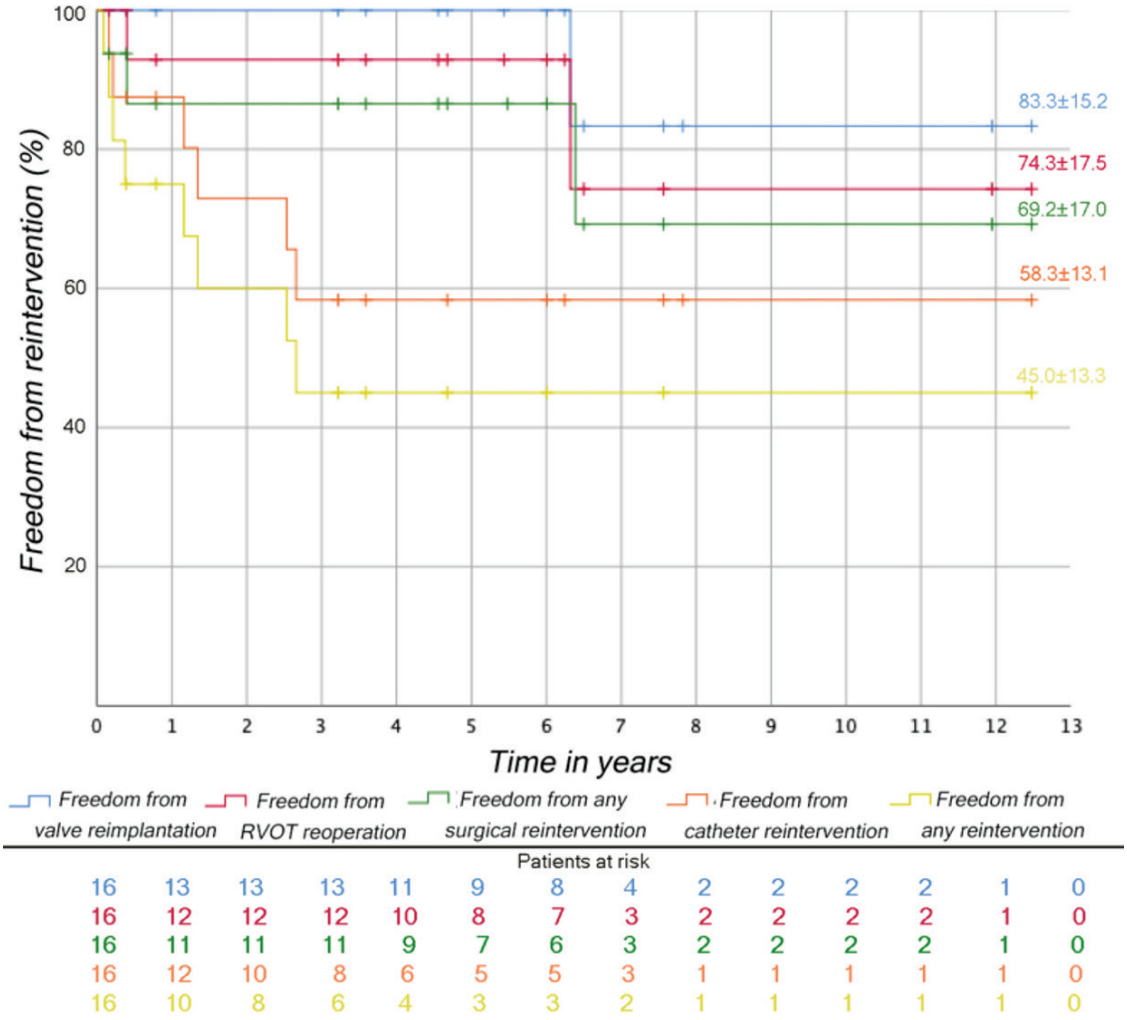
W. Bakhuis, N.A. Korsuize, A. van Wijk, H.B. Grotenhuis, F. Haas, P.H. Schoof
University Medical Centre Utrecht, Utrecht, The Netherlands

In single stage neonatal truncus arteriosus repair, right ventricle (RV) to pulmonary artery (PA) continuity is preferably established by means of a valved conduit. This conduit requires early right ventricular outflow tract (RVOT) reoperation for patient-conduit mismatch. By using a modified repair without a conduit, we hypothesized to avoid this early reoperation. We evaluated outcome and freedom from right-sided reoperation in our patient cohort.

We conducted a single-centre, retrospective study that included all patients that underwent truncus arteriosus repair between 2005 and 2019.

Single stage neonatal repair was performed in 16 patients with a mean age of 12.2 days old (range, 5–47 days) at a mean weight of 3.2 kg (range, 1.8–4.8 kg)). RV-PA continuity was established with a valved conduit in one patient and without in 15 patients (of which 14 direct RV-PA connections closed with autologous pericardium and 1 Goretex conduit). All patients survived the primary operation. Late death was absent. During median follow-up of 5.4 years (range, 0.01–12.5 years), RVOT reoperation was performed in 2 patients: one RVOT aneurysm repair at 0.4 years old and one valve reimplantation at 6.3 years of age (20mm pulmonary homograft). Branch pulmonary artery catheter reintervention was performed in 5 patients. Seven patients were free from any reintervention (Fig.1). All patients had good functional capacity (NYHA Class I or II).

Neonatal truncus arteriosus repair can be safely performed without a valved RV-PA conduit. Most children without valved conduit developed well and had no need for reoperation.


Freedom from reintervention (%)
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
12
13
Time in years
83.3±15.2
74.3±17.5
69.2±17.0
58.3±13.1
45.0±13.3
Freedom from valve reimplantation
Freedom from RVOT reoperation
Freedom from any surgical reintervention
Freedom from catheter reintervention
Freedom from any reintervention
Patients at risk
16 13 13 13 11 9 8 4 2 2 2 2 1 0
16 12 12 12 10 8 7 3 2 2 2 2 1 0
16 11 11 11 9 7 6 3 2 2 2 2 1 0
16 12 10 8 6 5 5 3 1 1 1 1 1 0
16 10 8 6 4 3 3 2 1 1 1 1 1 0

EVALUATING THE DIAGNOSTIC ACCURACY OF AORTIC DIAMETER, LENGTH AND VOLUME FOR PREDICTION OF AORTIC DISSECTION

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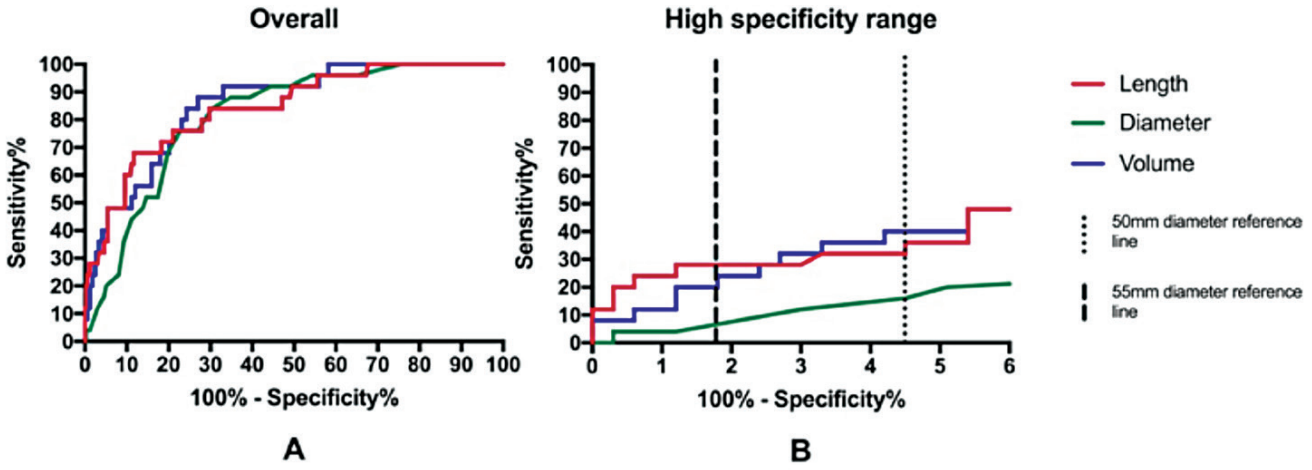
Management of thoracic aortic aneurysms (TAAs) comprises regular diameter follow-up until the threshold at which prophylactic surgical repair becomes indicated (usually ≥55 mm). However, this approach is unable to predict the majority of acute type A aortic dissections (ATAADs). Therefore, we aimed to evaluate the diagnostic accuracy of ascending aortic diameter, length and volume for occurrence of ATAAD.

The databases of our institutions (Maastricht University Medical Centre, Freiburg University) were reviewed for ATAAD patients who underwent computed tomography angiography (CTA) within 2 years before dissection onset. Aortic measurements in these patients were compared to healthy and TAA controls using a propensity score matching strategy.

25 out of 477 (5.2%) ATAAD patients underwent CTA before dissection and were included as the study group (pre-ATAAD). Based on pre-dissection scans, 96% did not meet the diameter threshold of 55 mm. While maximal diameters were comparable (44±6mm vs. 43±7mm, p=0.633), length (88±15mm vs. 74±9mm, p<0.001) and volume (125±41cm3 vs. 101±36cm3, p=0.032) of the ascending aorta were significantly larger in pre-ATAAD patients compared to matched controls. All three parameters had an area under the curve of >0.800. At the 55 mm cut-off point, diameter yielded a positive predictive value (PPV) of 20%. At same specificity, measurements of aortic volume and length showed superior diagnostic accuracy (PPV 55% and 70%, Figure 1).

96% of ATAAD patients would not have qualified for prophylactic aortic repair prior to dissection. Measurements of aortic volume and length have superior diagnostic accuracy compared to maximal diameter.

Figure 1:


Overall
Sensitivity%
100% - Specificity%
A
High specificity range
Sensitivity%
100% - Specificity%
B
Length
Diameter
Volume
50mm diameter reference line
55mm diameter reference line

LONG-TERM OUTCOMES AFTER BICUSPID AORTIC VALVE REPAIR: COMPARISON BETWEEN TWO ANNULOPLASTY STRATEGIES

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To compare long term outcomes after bicuspid aortic valve (BAV) repair using subcommissural annuloplasty (Cabrol stitch) versus valve sparing root replacement with the reimplantation technique (VSR).

From 1996 to 2018, 338 BAV repair were performed in our institution, of them 84 had a subcommissural annuloplasty (SCA group) and 189 received valve sparing reimplantation (VSR group). Patients under 18 years old (n=2), with no annuloplasty (n=37) or ring annuloplasty (n=19) and re-repair (n=7) were excluded from this study. Survival, BAV reoperation and valve related event (BAV reoperation, bleeding, embolism and cardiovascular death) were compared between groups. Inverse probability weighting (IPW) score using ten preoperative variables was used to balance the two groups. Cox regression analysis was used to identify predictors of late mortality, reoperation and valve related event.

Before matching, SCA group presented less aortic dilatation and more patch repair compared to VSR group. After IPW adjustment, pre and intraoperative characteristics were similar between groups except aortic cross clamp time which was longer in the VSR group ($p>0.001$). At 15 years, overall survival was similar between IPW matched groups (SCA: 93%±4% vs VSR: 93%±3%, $p=0.37$). Freedom from reoperation and freedom from valve related event was significantly lower in the SCA versus SVR group (64%±10% vs 87%±6%, $p<0.001$ and 57%±12% vs 74%±9%, $p<0.001$). By multivariate analysis, smoking and diabetes were independent risk factors of late mortality and cusp repair with patch and SCA were independent risk factors of reoperation and valve related event.

Compared to SCA, VSR provide similar long-term survival but a much better durability of the repair. VSR is a safe and efficient technique to repair all BAV phenotypes. SCA should not be used anymore to in BAV repair especially in presence of aortic regurgitation.

TREATMENT OF EXTENSIVE AORTIC VALVE ENDOCARDITIS WITH THE FREESTYLE BIOPROSTHESIS, A MIDTERM EVALUATION

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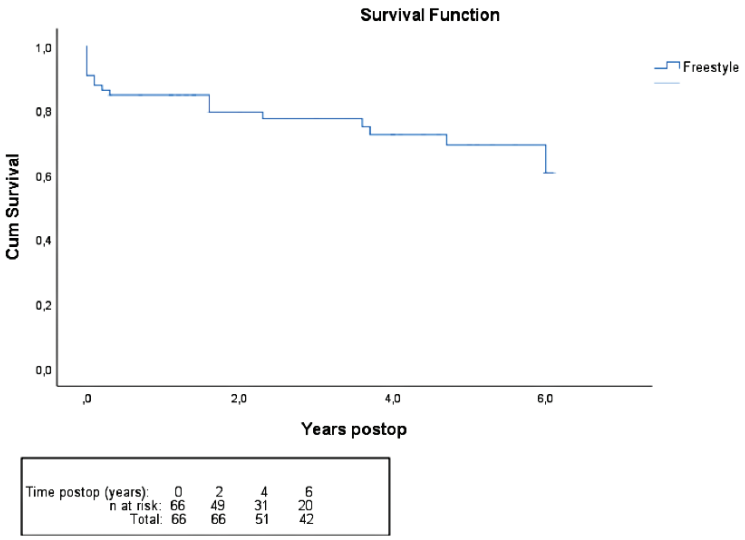
We aim to evaluate the outcome of the Freestyle bioprosthesis as a reliable and versatile treatment for extensive aortic valve endocarditis.

Infective aortic valve endocarditis can lead to destruction of the valve and perivalvular apparatus. After debridement, few surgical options enable reconstruction of the left ventricular outflow tract. Homografts were commonly used in the past however due to limited availability and limited durability, an alternative is needed. The Medtronic Freestyle porcine aortic root bioprosthesis has been used in aortic root surgery since 1992 with excellent clinical results. However, few studies investigated the Freestyle prosthesis in extensive aortic valve endocarditis.

Between 2002 and 2017, 66 patients received a Freestyle prosthesis at the University hospitals of Leuven for infectious endocarditis. Data was collected retrospectively, with complete follow-up and mean follow-up of 4.2 years. Major adverse end points (mortality, recurrence of endocarditis, structural valve degeneration and reoperation) were analysed.

The mean age at the time of operation was 64 ± 15.5 year. The mean Euroscore II was 22.2 ± 16.6, reflecting the high-risk population, moreover 12.1% (8/66) were in critical preoperative state. The indication for surgery was prosthetic valve endocarditis for 66.7% (44/66). Implantation techniques were subcoronary implantation 30.3% (20/66) and full root replacement 69.7% (46/66). Perivalvular abcedation was present in 89.4% (59/66) and 19.7% (13/66) had total root dehiscence. In-hospital mortality was 13.6% (9/66). Overall survival at 3 and 5 years was 73% (48/66) and 57% (29/51), respectively. Freedom from recurrent endocarditis at 6 years was 97%, and freedom from reoperation 95.5%. Echocardiographic follow-up did not reveal hemodynamically significant structural valve degeneration, although two patients developed a pseudo aneurysm in the aortic root which is stable in time.

This study shows that the Freestyle aortic root porcine bioprosthesis is a reliable option with good short- and midterm results in the treatment of aortic valve endocarditis. Although longer follow-up is needed to show a potential advantage in durability compared to aortic homografts.


Survival Function
Freestyle
Cum Survival
1,0
0,8
0,6
0,4
0,2
0,0
,0
2,0
4,0
6,0
Years postop
Time postop (years): 0 2 4 6
n at risk: 66 49 31 20
Total: 66 66 51 42

IMPROVED QUALITY OF LIFE AFTER AORTIC VALVE REPLACEMENT: IMPACT OF THE MINIMALLY INVASIVE APPROACH

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Earlier studies have shown that minimally invasive aortic valve replacement (m-AVR) has similar clinical outcomes as conventional aortic valve replacement (c-AVR). This study investigated patient-reported quality of life (QoL) as the primary outcome after m-AVR compared to c-AVR.

This study includes all patients who underwent isolated primary aortic valve replacement at our institution from December 2009 until March 2018. Patients were divided according to the surgical approach into two groups: group 1 (m-AVR; n=157) and group 2 (c-AVR; n=951). QoL was assessed 12-months postoperatively using SF-36 questionnaires. Mental (MCS) and physical components (PCS) of the QoL scores 12 months after surgery were compared. Linear regression analysis was performed to detect factors associated with postoperative QoL. Survival analysis and comparison between the two groups was performed.

1108 patients underwent AVR during the study period. M-AVR was not significantly associated with a difference in QoL after 1-year follow-up (PCS p=0.995 and MCS p=0.792). The multivariable regression analysis identified low baseline PCS (p = <0.001), logistic 1 (p = 0.007), BMI (p = 0.006) and COPD (p = 0.005) as independent risk factors of a decreased PCS 1 year after surgery. Low baseline MCS (p = <0.001) and BMI (p = 0.005) were identified as independent risk factors for decreased MCS 1 year postoperatively.

The operative approach of AVR does not predict QoL 1 year postoperatively. Preoperative factors including baseline QoL, BMI and EuroSCORE are more valuable in predicting postoperative QoL.

Table 1: Association between the surgical approach of AVR and the postoperative quality of life

	Physical component score (adjusted for all listed variables)			*Mental component score (adjusted for all listed variables)*		
	Beta	95% CI	P-value	Beta	95% CI	P-value
Surgical approach (m-AVR)	<0.001	-4.638 to 4.611	0.995	-0.011	-4.848 to 3.700	0.792
Baseline component score	-0.446	-0.561 to -0.375	<0.001	-0.493	-0.572 to -0.405	<0.001
Logistic EuroSCORE I	-0.121	-0.976 to -0.152	0.007	-0.070	-0.687 to 0.069	0.109
Body mass index	-0.122	-0.867 to -0.142	0.006	-0.121	-0.803 to -0.143	0.005
Chronic obstructive pulmonary disease	-0.125	-13.591 to -2.455	0.005	-0.076	-9.739 to 0.541	0.079

LONG-TERM EXPERIENCE WITH VALVE-SPARING ROOT REIMPLANTATION SURGERY IN TRICUSPID AORTIC VALVE

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To analyze our long-term experience with valve-sparing reimplantation technique in treating aortic root aneurysm, aortic regurgitation and aortic dissection in patients with tricuspid aortic valve.

Between March 1998 and October 2018, 303 consecutive patients underwent valve-sparing reimplantation in our institution. The mean age of this cohort was 52.9±15 years. Time to event analysis was performed with the Kaplan-Meier method. Risk of death, reoperation and AR recurrence were analyzed using the cox-regression method.

In-hospital mortality was 1% (n=3) of which 2 were admitted for acute aortic dissection. Median follow-up was 5.81 years ([IQR]: 2.8-10 years). Thirty-nine patients (14.4%) died during follow-up. At 5 and 10 years, overall survival was 92±2%and 75±4.9% respectively. Seventeen patients required late aortic valve reoperation. Freedom from valve reoperation was 95±2%. and 90±3%. Freedom from AR>2+ and AR>1+ at 10 years was 91±4% and 71.5±4.6% respectively. Significant multivariate predictors of death included age, NYHA, TAAD and preoperative LVEDD. Significant multivariate predictors of AR recurrence included indication for surgery, previous cardiac surgery, and presence of preoperative AR. Freedom from events like major bleeding, thromboembolic events and infective endocarditis at 10 years, were 97%, 98% and 96% respectively.

Aortic valve-sparing with the reimplantation technique has been performed for over two decades in our institution and the results in patients with TAV are excellent in terms of survival and freedom from valve-related adverse outcomes including valve reoperation. These results continue supporting the use of VSRR in patients with aortic aneurysm, irrespective of whether they have preoperative AR or not. VSRR is safe, durable and reproducible, but further follow-up, well into the second decade is still necessary.

MINIMALLY INVASIVE MITRAL VALVE SURGERY AFTER PREVIOUS STERNOTOMY WITHOUT AORTIC CLAMPING: SHORT AND LONGTERM RESULTS OF A SINGLE SURGEON SINGLE INSTITUTION

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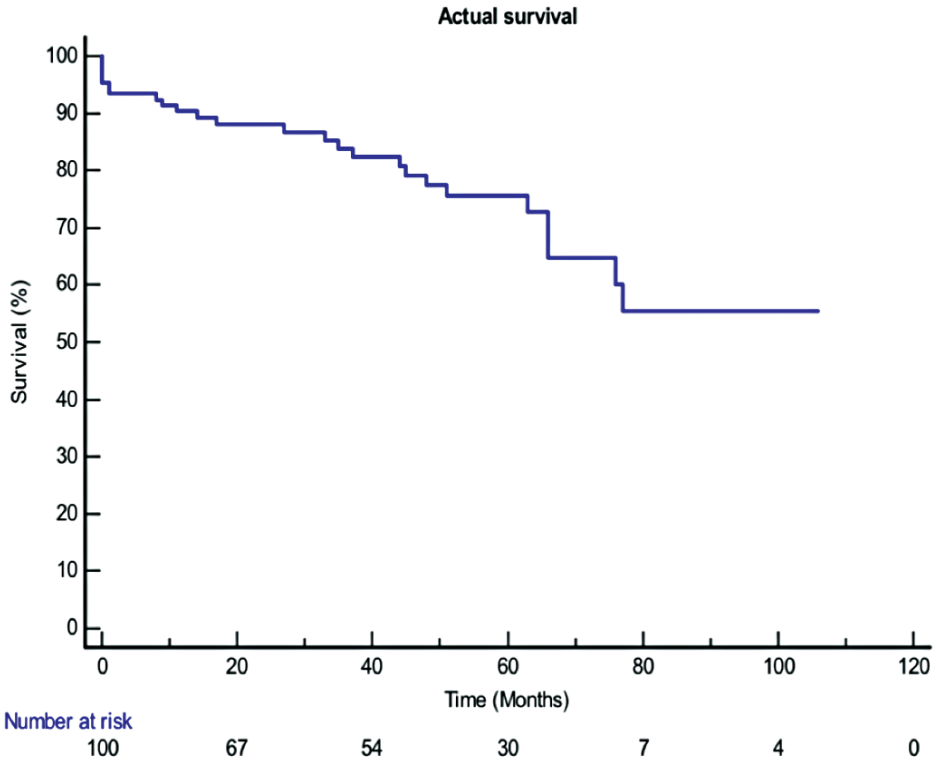
Minimal invasive mitral valve surgery (MIMVS) has become the standard approach for mitral valve pathology in many centres. The focus of this study is to analyze short- and long-term results of MIMVS after previous cardiac surgery on hypothermic fibrillating heart.

All consecutive patients undergoing MIMVS at our institution between December 2005 and December 2017 were studied retrospectively. Access was through right anterolateral mini thoracotomy, cannulation was in the groin vessels and myocardial preservation through hypothermic fibrillary arrest without aortic clamping. Primary outcome was in hospital complications, secondary outcome was long term survival.

103 Patients underwent MIMVS, with a mean age of 68 ± 9 years, 66% were male and left ventricular function was preserved in 64%. 71% had a 1st redo, 16,2% a 2nd redo, 4,8% a 3rd redo and 1,9% a 4th redo. 33,3% Had at least a previous AVR/Bentall, 30,5% had at least a previous CABG, 12,4% had at least a previous CABG + AVR/Bentall, 26,7% had at least a previous aortic surgery and 40,1% had at least a previous mitral valve surgery. Mean cardiopulmonary bypass time was 168 ± 46 minutes. Early mortality was 4,9% (3/103), stroke rate 1,9% (2/103), conversion to sternotomy 1,0% (1/103) and no per-operative aortic dissections. 5-years survival was 75,5% ± 5%.

Redo MIMVS on hypothermic fibrillary arrest is associated with an acceptable rate of overall complications, low stroke risk, low early mortality and acceptable late mortality. MIMVS has proven to be a safe approach for redo mitral valve surgery in our institution.


Actual survival
Survival (%)
100
90
80
70
60
50
40
30
20
10
0
0
20
40
60
80
100
120
Time (Months)
Number at risk
100
67
54
30
7
4
0

COMPLETENESS OF LYMPH NODE DISSECTION IN PATIENTS UNDERGOING MINIMALLY INVASIVE- OR OPEN SURGERY FOR NON-SMALL CELL LUNG CANCER: A NATIONWIDE STUDY

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In patients with NSCLC, lymph node metastases are an important prognostic factor. Despite an accurate pre-operative work up, for optimal staging an intrapulmonary- and mediastinal lymph node dissection (LND) as part of the operation is mandatory. The aim of this study is to assess the completeness of LND in patients undergoing an intended curative resection for NSCLC in the Netherlands and to compare performance between open and minimally invasive surgery (MIS).

In this retrospective national cohort study, the peroperative LND was evaluated in 7461 patients who had undergone a lobectomy for clinical N0-1 NSCLC between 2013 and 2018. The LND was considered complete, when at least three mediastinal (N2) lymph node stations, always including station 7, were sampled or dissected, in addition to the intrapulmonary (N1) lymph nodes from station 10 and 11. A comparison was made between MIS and open surgery.

Of 5154 patients, who had MIS, a sufficient intrapulmonary LND was performed in 47.9% and a sufficient mediastinal LND in 58.6%. A complete LND of both N1 and N2 stations was performed in 31.6%. For 2307 patients who underwent an open resection, these numbers were 45.0%, 59.0% and 30.6%, respectively. The overall hospital variation ranged between 0 and 72.5%.

A complete LND of both intrapulmonary- and mediastinal lymph nodes, in concordance with international guidelines, is performed only in a minority of patients in the Netherlands, with substantial between-hospital variation. No differences were seen between open surgery and MIS.

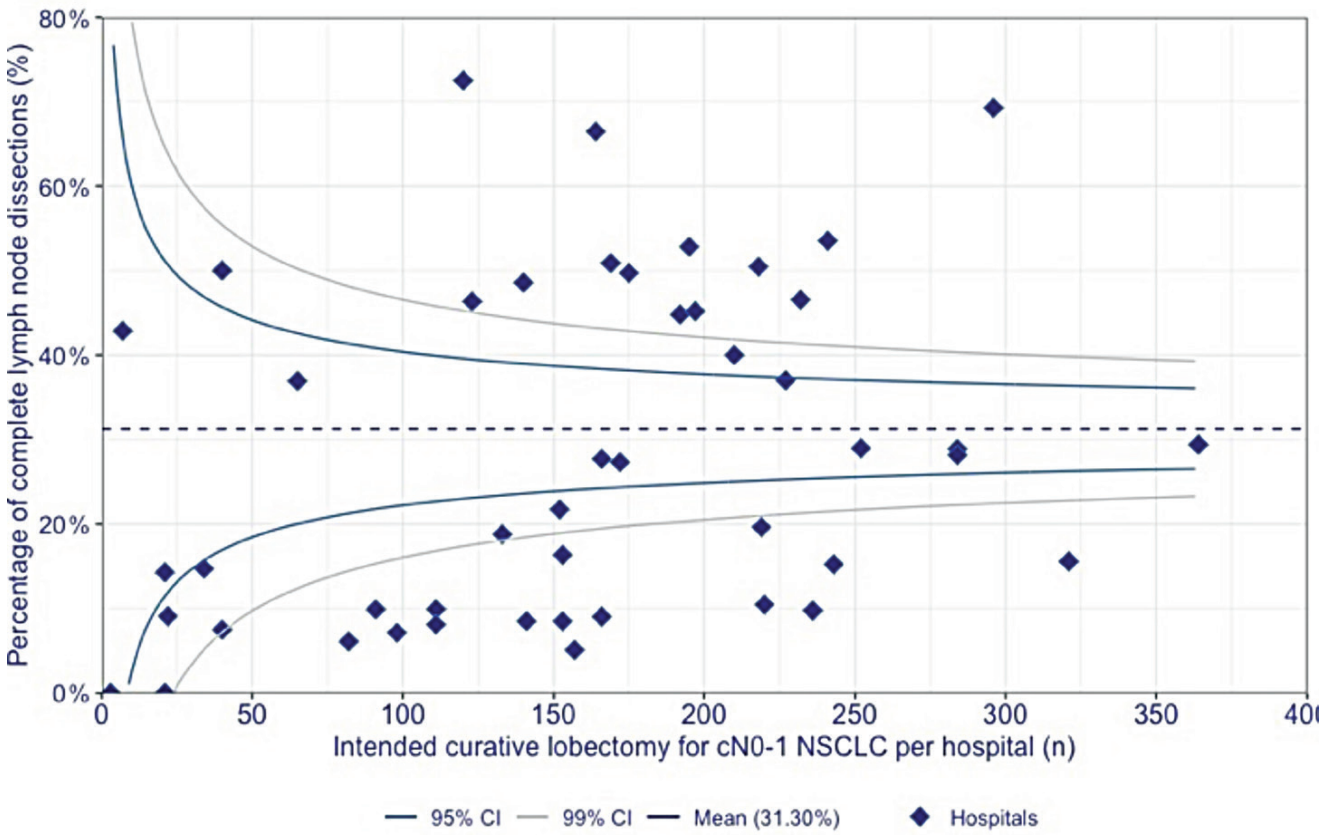

Figure 1. Funnel plot of between-hospital variation in completeness of LND according the IASLC guidelines in patients undergoing an intended curative lobectomy for clinical N0-1 NSCLC (2013-2018)

THE EFFECT OF DPP4 INHIBITION ON LUNG ISCHEMIA-REPERFUSION INJURY IN A MOUSE MODEL

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This experimental study aims to determine the effect of dipeptidyl peptidase 4 (DPP4) inhibition on lung ischemia-reperfusion injury (LIRI) in a ventilated and total anoxia mouse model.

Acute lung injury (ALI), and the more serious form acute respiratory distress syndrome (ARDS), are major causes of pulmonary morbidity and mortality. Thoracic trauma, extensive lung surgery, and lung transplantation are important risk factors for developing ARDS. In pulmonary transplant surgery, it has been shown that lung ischemia-reperfusion injury (LIRI) may cause severe lung injury and remains the main cause of primary graft failure. Currently, there is a lack of data regarding the pathogenesis of optimal treatment of LIRI. Earlier experimental studies have shown that inhibition of DPP4, a membrane bound serine protease, has a possible protective effect on ARDS after LIRI. These previous experiments were performed in models of total lung anoxia. However, a ventilated model provides a more realistic simulation of pulmonary embolisms and lung injury after lung transplantations.

A total of 71 mice were analyzed in this study. The mice were divided over a control group, sham group, total anoxic (TA) group and a ventilated anoxia (VA) group. Animals in the sham, TA and VA groups underwent a thoracotomy and 1h ischemia time followed by 0.5h or 4h reperfusion. Each treatment group was randomized to receive a DPP4 inhibitor (sitagliptin 300 mg/kg/24h) or no treatment. Arterial blood gasses, wet-to-dry ratios, and histological and immunohistochemical stains were used to compare the different groups. Statistical analysis was performed with 2-way ANOVA tests.

Regarding the arterial blood gasses, statistical significant differences for pCO2 ($p = 0.001$), pO2 ($p = <0.001$), lactate ($p = 0.002$), sodium ($p = 0.023$), potassium ($p = 0.001$), chloride ($p = 0.012$), hematocrit ($p = <0.001$) were found. Wet-to-dry ratios on the left lung ($p = 0.013$) and histological score ($p = <0.001$) also showed significant differences between the surgical arms. Furthermore, there was a significant difference for pO2 ($p = 0.013$), CD169 count ($p = 0.034$) and iNOS count ($p = 0.041$) between the groups with and without DPP4 inhibitor. Finally, there was a significant interaction effect for pO2 ($p = 0.024$), CD169 count ($p = 0.026$), and iNOS count ($p = 0.028$).

LIRI may contribute to pathophysiological and histological changes in the lung. DPP4 inhibition has a possible protective effect on LIRI and could play a role in the treatment of ARDS after LIRI.

PNEUMONECTOMY FOR LUNG CANCER: A SLIPPERY SLOPE?

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The aim of this study is to investigate early and long-term results in patients undergoing pneumonectomy for lung cancer at a single centre.

Despite the progress made in recent years regarding minimally invasive and parenchymal-sparing surgery, pneumonectomy is still necessary for patients with lung cancer when lesser resections are not possible. However, pneumonectomy remains a high-risk surgical procedure associated with significant morbidity and mortality.

Clinical and pathological characteristics of non-small cell lung cancer (NSCLC) patients treated by pneumonectomy between January 2008 and December 2013 were retrospectively reviewed. Overall 30- and 90-day mortality and 1-, 2-, and 5-year survival rates were calculated. To compare this data with a more recent cohort, a post-analysis of patients operated between January 2014 and December 2017 was performed as well. Postoperative complications and disease progression or recurrence were analysed by descriptive statistics. Univariate and multivariate analyses of factors related to long-term survival were also performed.

Of the 126 patients reviewed in the cohort of 2008-2013, a total of 61 patients with an overall mean age of 64±8.9 years, underwent pneumonectomy. The 30- and 90-day mortality rates were 6.6% and 16.4%, respectively. Overall 1-, 2-, and 5-year survival were 70.5%, 57.4%, and 34.5%, respectively. Five-year survival was significantly correlated to disease stage (p=0.0415) and disease recurrence (p=0.0452). Ninety-day mortality was significantly correlated to the occurrence of postoperative complications (p=0.0078). In the cohort of 2014-2017, 30- and 90-day mortality rates were 5.4% and 8.1%, respectively. Furthermore, overall 1- and 2- survival were 70.3% and 59.5%, respectively. No significant difference in survival was found between the two cohorts during post-analysis (p=0.64). Recurrent disease was seen in 34.4% and 27.0% in the cohorts of 2008-2013 and 2014-2017, respectively. Most frequent early complications were atrial fibrillation (41.0%), pneumonia (23.0%), and acute respiratory failure (18.3%).

Despite careful patient selection, pneumonectomy yields high mortality and morbidity rates. In this way, it should only be performed when no other therapeutic options are available. Rigorous preoperative work-up and risk stratification models are necessary to obtain acceptable long-term results.

20 YEARS OF PULMONARY ENDARTERECTOMY IN UZ LEUVEN

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To assess short and long-term outcomes of pulmonary endarterectomy (PEA) surgery in UZ Leuven.

Chronic thromboembolic pulmonary hypertension (CTEPH) results from incomplete resolution of pulmonary thromboemboli and formation of a chronic, fibrotic, flow-limiting organized thrombus within the pulmonary vascular bed. PEA is a high risk, complex and technically challenging procedure. It requires cardiopulmonary bypass with deep hypothermic circulatory arrest to remove the fibrotic tissue via a dissection plane in the pulmonary vascular wall. PEA offers the best chance on improvement in eligible patients and remains the only potential curative option.

Data from all CTEPH patients that underwent a PEA in our institution between 1999 and 2018 were retrospectively analyzed from our pulmonary hypertension database.

From 442 patients diagnosed with CTEPH, 209 underwent a PEA. Median age was 60 (10-92) years (47% male). In-hospital mortality was 7.6% but decreased from 10% in our first 100 patients to 4% for the last 50 patients. Mean deep hypothermic cardiac arrest time was 40±17 minutes. After surgery, patients were mechanically ventilated for 3 (1-75) days, stayed at intensive care for 6 (1-75) days, and were hospitalized for 19 (1-117) days. Mean pulmonary artery pressure and pulmonary vascular resistance decreased from 46 ± 11 to 28 ± 10 mmHg ($p<0.0001$) and from 810 ± 380 to 342 ± 214 dynes*sec/cm5 ($p<0.0001$), respectively. Cardiac index increased from 2.13 ± 0.53 to 2.55 ± 0.52 L/min/m2 ($p<0.0001$). The exercise capacity improved after surgery with a decrease in New York Heart Association functional class from 2.6 ± 0.7 to 1.7 ± 0.7 ($p<0.0001$) and an increase in 6-minute walking distance from 341 ± 138 to 434 ± 134 m ($p<0.0001$). Finally, survival at 1, 5 and 10-year, was 90, 84 and 69%, respectively.

For 20 years, PEA is regularly performed in UZ Leuven with an in-hospital mortality, long-term survival and improvement in exercise capacity that are excellent and equivalent to large volume centres in Europe.

HEART DONATION FROM DONORS AFTER CIRCULATORY DEATH USING NORMOTHERMIC REGIONAL PERFUSION

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C.H.U. Sart Tilman, Liège[1], U.Z. Gasthuisberg, Leuven[2], Belgium

DCD (DCD) heart transplantation (HT) has not reached wide clinical application yet, mainly because of concerns regarding the potential deleterious effects of warm ischemia occurring during DCD on heart function and viability.

We report on 4 cases of successful DCD heart retrieval including one pediatric case.

The Liege protocol for Heart Donation after Circulatory Death (HDCD) was accepted by the institutional Ethical Committee. It utilizes elements of both the Denver and Papworth groups in a way that minimizes the exposure of the heart to warm ischemic injury. The main features of the protocol are antemortem interventions combined with the use of thoracoabdominal normothermic regional perfusion (NRP). The retrieved hearts were cold-stored and transplanted.

Over the past year, 4 hearts from donors after circulatory death were successfully retrieved using NRP. Donor and procedural data are depicted in Table. In one patient the heart was procured and transplanted in a neighbouring centre (donor 3). All recipients survived 30 days. One recipient (donor 2) died due to septic shock 8 months after the transplantation.

	Donor 1	Donor 2	Donor 3	Donor 4
Age (years)	24	48	12	51
Gender	Male	Male	Male	Female
Height (cm)	183	177	162	175
Weight (kg)	60	94	42	90
Cause of WLST	Trauma	Trauma	Hypoxia	Stroke
WLST to circulatory arrest (min)	18	15	11	18
WIT (min)	25	26	18	27
Knife to onset NRP (min)	2	6	2	4
NRP duration (min)	20	20	16	15
DCD heart assessment 30 min after weaning NRP				
MAP (mmHg)	65	56	70	50
LVEF	70%	59%	57%	63%
CO/ CI	6.3 / 3.4	5.7 / 2.7	4.5 / 3.3	7.6 / 3.7

WLST: withdrawal of life support therapy – WIT: warm ischemic time

Transplantation of hearts from DCD donors is very infrequent. The use of NRP is an attractive option for the resuscitation, reperfusion, and preservation of transplanted hearts. It also allows a functional assessment of organs prior to transplantation. For distant DCD heart procurement, NRP and cold storage transportation can be used for reasonable cold ischemic times. However, antemortem interventions raise several ethical issues, limiting its adoption in some countries.

CLINICAL AND ECHOCADIOGRAPHIC RESULTS OF COMPLEX TRICUSPID REGURGITATION REPAIR

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We aimed to present the clinical and echocardiographic outcomes of these complex TR repairs.

The gold standard treatment of tricuspid regurgitation (TR) is isolated annuloplasty. Complex TR aetiologies (congenital, organic, infective, traumatic, iatrogenic, or severe tenting) need additional reparative techniques.

Among 481 patients who benefited from tricuspid repair, 52 needed a more complex repair (consisting of more than a ring annuloplasty). TR was due to severe leaflet tethering (>8cm) in 34 patients, Ebstein's anomaly in three, rheumatic valve disease in two, acute endocarditis in three, previous trauma in one, and PM lead related in 11. Besides a semi-rigid ring annuloplasty, leaflet augmentation was used in 38 patients, neo-chordae in nine, PM lead repositioning in 10, triangular resection in one, and secondary chord resection in two. After a median follow-up of 3.2 years, survivors underwent a transthoracic echocardiogram and cardiorespiratory exercise testing with maximal oxygen uptake (VO2 max) recording.

The 30-day and 10-year survival rates were 86.5% and 54%, respectively. New York Heart Association stage III or IV was documented in 5.7±0.1% of the patients. The mean VO2 max was 13.2±3.6 ml/kg/min corresponding to 53.5% of the predicted value. At 10 years, the cumulative incidence of severe TR was 14.8±0.3%. The ejection fraction (0.43±0.12 versus 0.48±0.1; p=0.02), right ventricular end-diastolic area (15.3±4.6 cm^2 versus 11.1±6.1 cm^2; p <0.01), and pulmonary pressure (33.29±13.45 versus 27.26±7.83; p=0.03) improved significantly.

TV repair in complex pathologies is safe, effective, and durable; nevertheless, these patients still have limited functional capacities.

DOES ENDOMYSIAL FIBROSIS PLAY A ROLE IN THE OCCURRENCE OF POST-OPERATIVE ATRIAL FIBRILLATION?

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The occurrence of post-operative atrial fibrillation (POAF) most likely results from an interplay between acute surgery-induced factors and more chronic pre-existent factors related to structural remodelling of the heart. While the role of surgery-induced factors has been extensively studied, the contribution of structural remodelling is less well known. Here, we study the role of endomysial fibrosis (fibrosis in between muscle bundles), among other parameters, in relation to POAF.

In right atrial appendages (RAA) of patients (n=85, age=63±10yrs, female=40%) undergoing cardiac surgery (CABG=34%/AVR=33%/MV surgery=22%/combined procedures=11%), total fibrosis and inflammatory infiltration was quantified using histological analysis. The quantification of endomysial fibrosis, capillary density, fibroblast density and again total fibrosis was performed with immunohistochemistry.

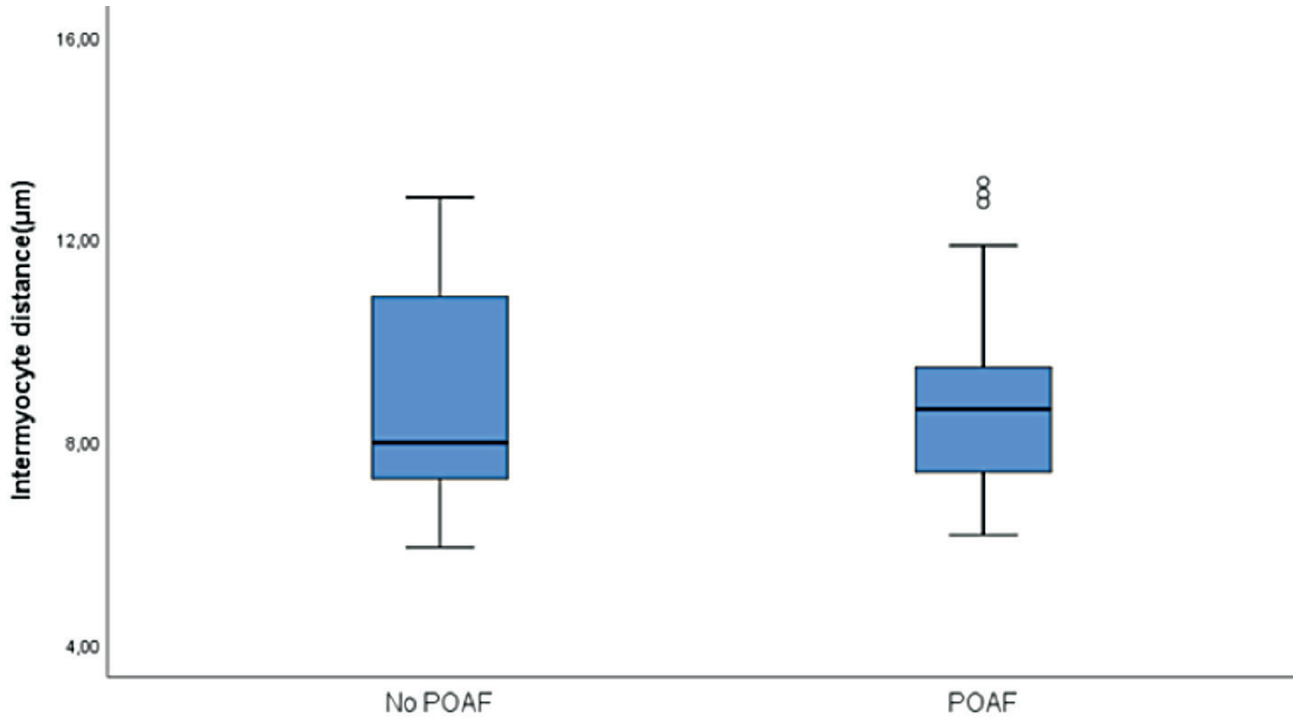

Figure 1: Distribution of intermyocyte distance(endomysial fibrosis) for POAF versus no POAF

Detailed histological and immunochemistry analysis of RAA did not show significant differences in total fibrosis (POAF 19.0% vs NoPOAF 18.0%, P=ns; POAF 60.0% vs noPOAF 57.6%, P=ns; respectively), endomysial fibrosis (POAF 8.8 µm vs NoPOAF 8.0 µm; P=ns), myocyte diameter (POAF 16.7 µm vs NoPOAF 17.2 µm; P=ns), fibroblast density (POAF 15.4% vs NoPOAF 15.0%; P=ns) nor capillary density (POAF 2.0% vs NoPOAF 1.8%; P=ns) between patients with and without POAF. The degree of atrial inflammatory infiltration was too low to allow meaningful quantification.

Detailed analysis of human RAA did not show differences in well-known pathophysiological processes underlying structural remodelling between patients with and without POAF. Therefore, our findings suggest that the role of surgery-induced factors is more important than the presence of a pre-existent AF substrate in the electro-pathophysiological mechanism leading to early POAF after cardiac surgery.

REAL LIFE WIDE ADOPTION OF MINIMALLY INVASIVE MITRAL VALVE SURGERY. A RETROSPECTIVE ANALYSIS OF THE OLVG EXPERIENCE

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We have a full adoption of minimally invasive mitral valve surgery (MVS) in our centre. It is standard of care for minimally invasive MVS from elective surgery to emergency cases. The aim of this study was to evaluate the short and midterm outcome of our mini MVP series in our hospital.

In this retrospective study we analyzed all patients (elective and emergency cases including re-do cases) who were operated on for mitral valve plasty (N=267) or mitral valve replacement (N=92) with or without concomitant ablation (N =65) or tricuspid valve repair (N =64) at our Hospital from 2015 until 2019.

There were 359 patients in total. Mean ICU stay was 37 hours. Mean stay at the ward was 5 days. Mean cross-clamp time was 108 minutes (+/- 47 minutes). Mean CPB time was 152 minutes (+/- 56 minutes). Overall thirty-day mortality was 1.4% (5 patients). None of the patients had a peri-operative infarction. Three patients (0.8%) had a stroke in the post-operative setting. Five patients (1.4%) needed a sternotomy due to bleeding complications whereas 6 patients (1.7%) needed a re-exploration (VATS assisted) for a hemothorax. Twelve patients (3.3%) received a pacemaker implantation due to severe rhythm disturbances.

Minimally invasive MVS is a safe approach associated with low mortality and morbidity, high rate of successful mitral valve repair and excellent results. The series we describe is a sample of "real life situation" where elective and emergency cases are treated through a minimal access.

A NOVEL IN VITRO FLOW MODEL FOR TESTING MECHANICAL HEART VALVE ANTICOAGULANT THERAPIES: PROOF OF CONCEPT

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Mechanical heart valves (MHV) present a risk of thromboembolic complications. Consequently, patients with MHV require lifelong anticoagulants, accompanied by adverse effects such as increased bleeding risk. Further steps in the development and implementation of new anticoagulants are impeded due to the lack of adequate in-vitro models. The aim of this study was to develop an in-vitro model for testing promising anticoagulant therapies and examine the thrombogenicity of MHV in the model.

The model design features an MHV within a torus with minimal priming volume and contact surface area, using dimensions based on the aorta geometry (Figure 1a/b). A dedicated control system drives the oscillating rotational motion of the torus, to generate a physiological flow through the MHV. For verification purposes, a blood analogy test fluid seeded with particles was used to analyze model performance in terms of velocity and flow rate. In the next step of the verification process, experiments were conducted using porcine blood.

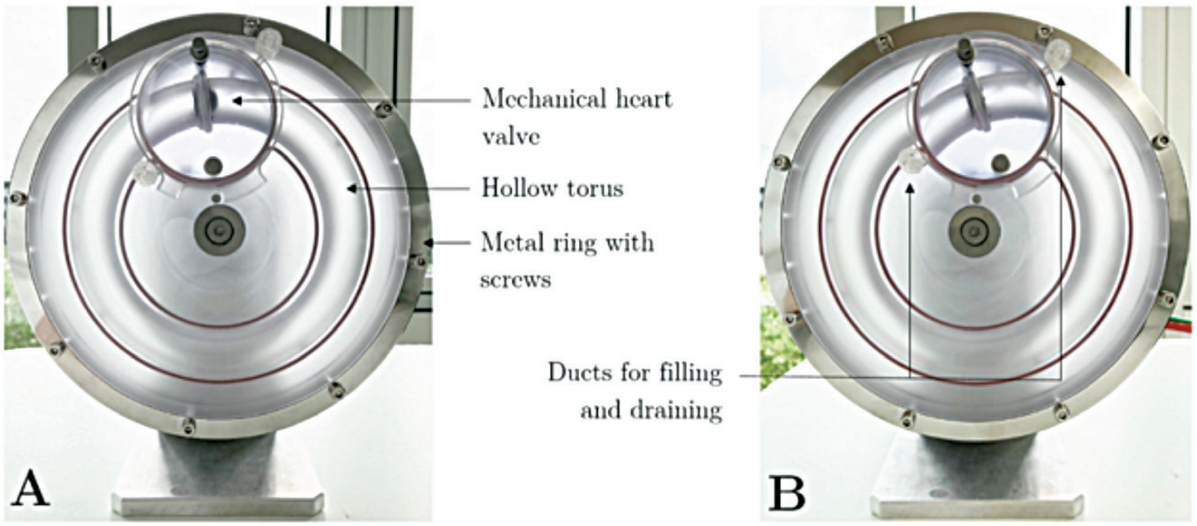

Figure 1. The in vitro model comprises a mechanical heart valve and a hollow torus. The metal ring with screws and the screw in the center secure two compartments to one another and to the servomotor. A: Closed setting, torus is not connected to the ducts. B: Open setting, valve compartment is twisted to connect the torus to two ducts indicated by the arrows.

Results of fluid velocity and flow were obtained using a speckle tracking method on high-speed video recordings of the rotating model. The flow rate resembled the physiological flow rate in the aortic root, in both shape and amplitude. With porcine blood, thrombi on the MHV were observed to be associated with the suture ring in all cases.

Considering these results in combination with the uniquely low priming volume and limited contact surface, it can be concluded that the novel in vitro model seems suitable for testing the potential of new anticoagulants.

RIGHT VENTRICLE EVALUATION BY CARDIAC MAGNETIC RESONANCE BEFORE AND AFTER MITRAL VALVE SURGERY

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Our study aims to describe the short-term evolutions of RV volumes and function measured by cardiac magnetic resonance (CMR) after mitral valve surgery in patients with less than severe tricuspid regurgitation.

The fate of right ventricle function after mitral valve surgery and without severe tricuspid regurgitation is still not well defined.

60 patients underwent mitral valve surgery, 58 for degenerative and 2 for functional disease were analyzed by CMR preoperative and at 6 months. One patient with severe tricuspid regurgitation and 6 who received a tricuspid annuloplasty were excluded, with 52 patients remained for the analysis. Indexed end-diastolic and systolic volumes (RVEDVi and RVESVi) ejection fraction (RVEF) and stroke volume (RVSV) were the primary outcomes of the study. Multivariate linear regression was used to identify risk factors related to the right ventricle volumes and function improvement.

Mean age was 57+/-21 years and 40 patients were male. In the global population RVEDVi (83.5 ml/m2 vs 80.1 ml/m2, $p<0.01$), RVESVi (43.4 ml/m2 vs 38.6 ml/m2, $p<0.01$) and RV ejection fraction (48.3% vs 52.4%, $p<0.01$) improved significantly while the stroke volume (78.1 ml vs 79.7 ml, $p=0.6$) did not. Preoperative RV volumes and ventricular function predict the postoperative improvements.

Mitral valve repair improves right and left ventricle dimensions. RV stroke volume remained unchanged, while the RV function improved after surgery. Whether prophylactic tricuspid surgery could improve RV function, even more, remains to be determined.

PORT-ACCESS MITRAL AND TRICUSPID SURGERY IMPROVES SHORT AND LONG TERM OUTCOME AFTER PREVIOUS CABG

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This study aims to evaluate the short and long-term outcomes of endoscopic mitral and tricuspid surgery following previous coronary artery bypass grafting.

Redo surgery carries increased surgical risk, in particular after previous coronary artery bypass grafting. This is due to technical entry challenges, risk of injury to patent grafts, impaired ventricular function, cardiomyopathies, vasculopathies and issues related to myocardial protection. With advances in cardiac surgical outcomes and improved health care, more patients present with mitral and tricuspid valves insufficiency after previous coronary artery bypass grafting.

Retrospective analysis of prospectively collected data. In-hospital outcome was assessed through analysing hospital records for preoperative data, operative details and postoperative outcomes. Clinical long-term follow-up was performed through searching central database for survival and latest clinical review. Echocardiographic follow up was based on the latest available echo. Between Feb 1997 and October 2018, total of 3055 patients underwent endoscopic port access surgery at our institute. Of those 148 patients underwent 149 operations of redo endoscopic mitral and tricuspid valve surgery after previous CABG. Mean Age: 71.57 ± 8.1, Females: 46 (30.9 %), Good LV: 93 (62.4 %), Logistic Euroscore I: 26.71 ± 19.9 and EuroScore II (n=40): 18.69 ± 15.1

Total of 149 redo port access operations were performed, 24 had second redo, 3 had third redo and one patient had a fourth redo. Mean duration between first and last operation was 10.34 +/- 7.55 years. The In-hospital and 30 days mortality was 15 (10.06%) patients the 1-year survival was 86.46%, 5-year survival was 60.6% and 10-year survival: 36.77%, with a Median survival of 7.92 years.

Redo endoscopic mitral and tricuspid valve surgery after previous CABG is associated with excellent short- and long-term outcomes. The associated in-hospital and 30 days mortality was significantly lower than EuroScore predicted. The rate of peripherative complications including CVAs, myocardial infarction, and low cardiac output was very low in this high-risk group of patients.

LONG-TERM FOLLOW-UP OF THORACOSCOPIC ABLATION FOR LONG-STANDING PERSISTENT ATRIAL FIBRILLATION: CONTINUOUS VS INTERVAL RHYTHM MONITORING

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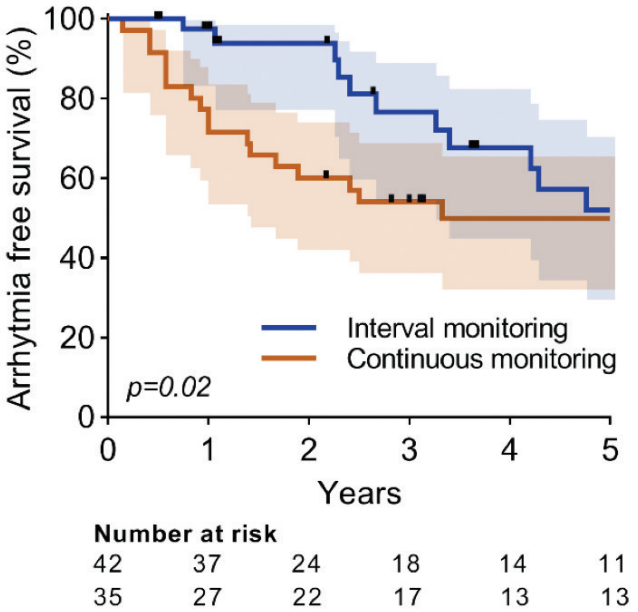
Catheter ablation in patients with long-standing persistent AF (LSPAF) remains challenging and often requires repeated procedures with variable results. We report long-term outcomes of a bipolar thoracoscopic pulmonary vein and left atrial posterior wall ablation for LSPAF, and compare continuous and interval rhythm monitoring.

Seventy-seven LSPAF patients who underwent thoracoscopic pulmonary vein and box isolation between 2009-2017 in two Dutch centres were included. Follow-up consisted of continuous rhythm monitoring using an implanted loop recorder or 24-h Holter at 3/6/12/24/60 months.



Mean age was 59±8 years with a median AF duration of 3.8 [1.2-6.3] years. In the total cohort, at 2-year follow-up, 86.0% of patients were in sinus rhythm, 12.3% were in paroxysmal AF and 1.6% in persistent AF. At 5 years, 62.9% of patients were in sinus rhythm, 20.0% in paroxysmal AF, 14.3% in persistent AF and 2.9% was experiencing atrial flutter. Continuous rhythm monitoring was performed in 46% of patients. Comparing continuous and interval rhythm monitoring, freedom from any atrial arrhythmia episode at 2- and 5 years was 60.0% and 49.9% in the continuous group and 93.8% and 51.9% in the interval monitoring group, respectively (p=0.02, Breslow-Wilcoxon test).

Thoracoscopic box ablation is highly effective in restoring sinus rhythm at medium term follow-up. However, it is not a curative treatment as demonstrated by the 50% arrhythmia-free survival at long-term follow-up. Whether this is due to the progressive nature of AF needs further investigation. Continuous rhythm monitoring shows earlier recurrence detection with a potential early treatment adaptation.

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