PROGRAMMA NAJAARSWEBINAR NVT

13 november 2020

Nederlandse Vereniging voor
Thoraxchirurgie

Abstractsessie: van 12.45 tot 14.15 uur
ALV: van 14.45 tot 16.00 uur

Organisatie, accreditatie, ALV

Organisatie
K. Averink
Nederlandse Vereniging voor Thoraxchirurgie
Mercatorlaan 1200
3528 BL Utrecht

Tel: 030 899 0640
E-mail: secretariaat@nvtnet.nl

Abstractcommissie
Prof.dr. W.J. Morshuis (voorzitter)
Prof. dr. P.H. Schoof
Drs. W.W.L. Li

Inschrijving en accreditatie
Inschrijven voor deze voorjaarsvergadering kan via het aanmeldformulier op de website.

Deze Webinar wordt geaccrediteerd en gewaardeerd met 4 punten wanneer u ook aan de ALV deelneemt. 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. De ALV zal toegankelijk zijn via een aparte link welke men ontvangt na aanmelding via de website.

Programma 13 november 2020

12.45 uur	**Opening**
12.45 – 14.15 uur	**Wetenschappelijke Webinar - abstracts**
12.55 uur	**O.B. Dolmaci** A MODIFIED SURGICAL TECHNIQUE OF AORTOPEXY FOR TRACHEOBRONCHOMALACIA
13.03 uur	**L.M. Kraaijkamp** UNIPORTAL VS MULTIPORTAL VATS (SUB)LOBECTOMY FOR TREATMENT OF NON-SMALL CELL LUNG CARCINOMA, A SINGLE-CENTRE HISTORIC COHORT STUDY
13.11 uur	**A.M. Kougioumtzoglou** FIRST RESULTS OF A DUTCH COHORT OF PATIENTS UNDERGOING PERSONALIZED EXTERNAL AORTIC ROOT SUPPORT
13.19 uur	**O.C.D. Liesdek** EVIDENCE FOR CONTACT ACTIVATION AFTER IMPLANTATION OF A LEFT VENTRICULAR ASSIST DEVICE IN PATIENTS WITH END-STAGE HEART FAILURE
13.27 uur	**T. Somers** CARDIOMYOCYTE TOXICITY OF STATINS
13.35 uur	**C.L. Kok** PERSISTENT VERSUS PAROXYSMAL ATRIAL FIBRILLATION, THREE YEAR FOLLOW UP AFTER MINIMALLY INVASIVE PULMONARY VEIN AND POSTERIOR BOX ISOLATION, USING A CONTINUOUS LOOP MONITOR TO DETERMINE PREOPERATIVE CLASSIFICATION AND POSTOPERATIVE RESULTS
13.43 uur	**R.K. Kharbanda** FIRST EVIDENCE OF ATRIAL CONDUCTION DISORDERS IN PEDIATRIC PATIENTS WITH CONGENITAL HEART DISEASE BEFORE THE FIRST YEAR OF LIFE
13.51 uur	**J.A. Fleerakkers** TOTALLY THORACOSCOPIC ABLATION: A UNILATERAL RIGHT-SIDED APPROACH
13.59 uur	**N.M.A.J. Timmermans** RECOVERY OF CONDUCTION DISORDERS AFTER PERCEVAL SUTURELESS AORTIC VALVE REPLACEMENT

14.07 uur **K. Ko**
MITRAL VALVE REPAIR VERSUS REPLACEMENT IN THE ELDERLY: A PROPENSITY WEIGHTHED ANALYSIS

14.15 – 14.45 uur **Pauze**

14.45 – 16.00 uur **Algemene Ledenvergadering**

Abstract

12.55 uur

A MODIFIED SURGICAL TECHNIQUE OF AORTOPEXY FOR TRACHEOBRONCHOMALACIA

O.B. Dolmaci[1], M.M. Fockens[2], C.E.L. Hoekstra[2], D.R. Koolbergen[1]
[1]*AMC/LUMC, Amsterdam/Leiden*; [2]*AMC, Amsterdam*

Purpose
Tracheobronchomalacia (TBM) is characterised by collapse of trachea (TM), bronchi (BM) or both, leading to dyspnoea, expiratory stridor, coughing or recurrent airway infections. Surgical treatment with aortopexy is warranted for severe tracheobronchomalacia (TBM), but the results reported in literature are variable. This study describes a modified aortopexy technique with the use of a PTFE ribbon sutured onto the aortic in order to lift the arch and its side branches more effectively. The aim of this study was to evaluate the outcomes of this modified anterior aortopexy technique.

Methods
Retrospective chart review of all patients undergoing aortopexy with the use of a PTFE ribbon between January 2010 and June 2020 in two academic hospitals in The Netherlands. The PTFE ribbon was sutured over approximately half of the anterior surface of the aortic arch in order to distribute the traction force more evenly and more effectively.

Results
Twenty-five patients (median age 11 months (IQR 2-132 months); 76% male) underwent aortopexy with the modified technique for TBM (52%), TM (40%) or BM (4%). Aortopexy was successful in 92%, defined as relief of respiratory symptoms and freedom from ventilatory support. Mortality was 4%.

Conclusion
This modified anterior aortopexy technique is a safe and effective treatment option for paediatric patients with severe TM.

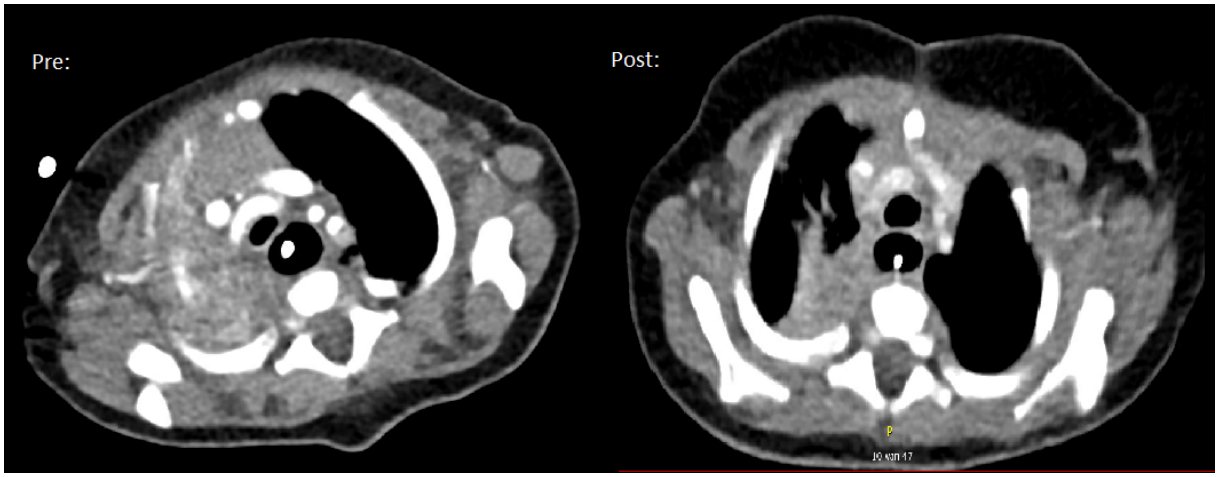


Figure 1: Pre and postoperative computed tomography scans of a patient with tracheobronchomalacia. Left: preoperative scan showing a malatic trachea with a diameter of 3mm at the origin of the brachiocephalic trunc. Right: Postoperative scan of the same patient showing an increase of the tracheal lumen diameter after aortopexy.

Abstract

13.03 uur

UNIPORTAL VS MULTIPORTAL VATS (SUB)LOBECTOMY FOR TREATMENT OF NON-SMALL CELL LUNG CARCINOMA, A SINGLE-CENTRE HISTORIC COHORT STUDY

L.M. Kraaijkamp, S.M. van der Heide, A.F.T.M. Verhagen
RadboudUMC Nijmegen

Purpose
Although available literature about uniportal VATS lobectomy for treatment of non-small cell lung carcinoma (NSCLC) suggests that it is safe and feasible, evidence is limited and sometimes even contradictory regarding short-term clinical outcomes. The aim of this study was to confirm the safety and feasibility and to further explore differences compared to multiportal surgery.

Methods
This was a single-centre historic cohort study. Short-term clinical outcomes of patients that underwent a (sub)lobectomy by uniportal VATS for treatment of NSCLC from a period of 4 years were collected from electronic medical records and compared to outcomes of patients that were treated with multiportal VATS.

Results
106 patients were included in the uniportal group and 109 in the multiportal group. Groups were comparable at baseline except for BMI and the resection performed. No statistical differences between groups were found for radicality of resection, completeness of lymph node dissection, 30-day mortality, conversions, complications, operation duration, post-operative drainage and post-operative hospitalisation. A small but statistically significant advantage of uniportal VATS was found in pain scores of resting patients on post-operative day 2 and 3: a median score of 1 versus 2 on both days (P=0.030 and P=0.033). Other pain scores, although differences were not statistically significant, were all in favour of uniportal VATS as well.

Conclusion
Uniportal VATS (sub)lobectomy is a safe and feasible treatment for non-small cell lung carcinoma, as it results in comparable short term outcomes compared to the conventional multiportal (sub)lobectomy and it may even result in slightly less post-operative pain.

Abstract

13.11 uur

FIRST RESULTS OF A DUTCH COHORT OF PATIENTS UNDERGOING PERSONALIZED EXTERNAL AORTIC ROOT SUPPORT.

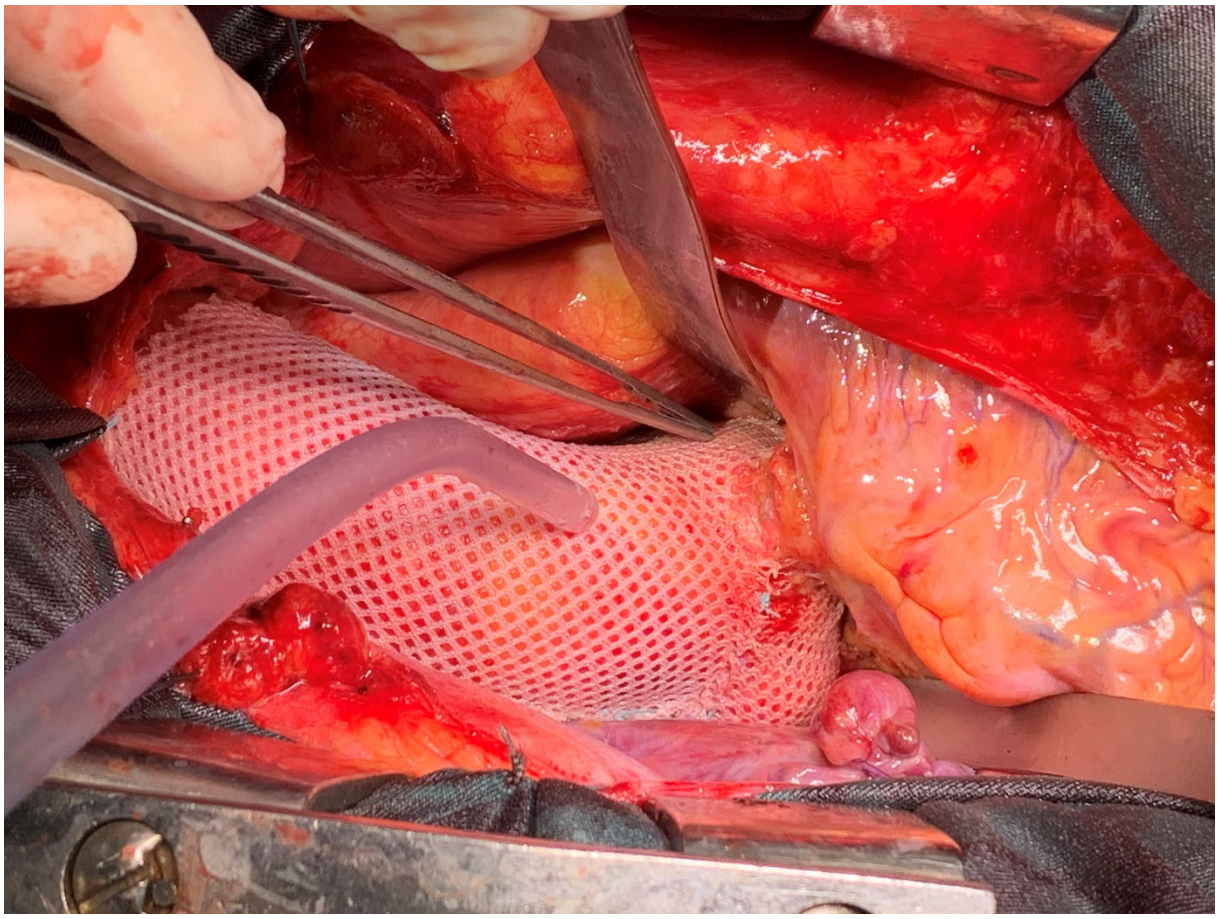
A.M. Kougioumtzoglou[1], O. Dolmaci[1], B.J. Bouma[1], A.J.H.A. Scholte[2] , A.P.C.M. Backx[3], O. Corsmit[4], S.L. Note[5], T.J. van Brakel[6], C. Austin[7], R.J.M. Klautz[1,6], M.G. Hazekamp[6], D.R. Koolbergen[1,6]
[1]*Department of Cardiothoracic surgery, Amsterdam University Medical Centers, Location AMC, Amsterdam;* [2]*Department of Cardiology, Leiden University Medical Center, Leiden*; [3]*Department of Cardiology, Amsterdam University Medical Centers, Location AMC, Amsterdam;* [4]*Department of Anaesthesiology, Amsterdam University Medical Centers, Location AMC, Amsterdam;* [5]*Department of Anaesthesiology, Leiden University Medical Center, Leiden*; [6]*Department of Cardiothoracic surgery, Leiden University Medical Center, Leiden*; [7]*Department of Cardiothoracic Surgery, London Bridge Hospital, London, United Kingdom;*

Purpose
To evaluate the safety and efficacy of PEARS in the first 25 patients with connective tissue disease and aortic root aneurysm.

Methods
From January 2018 to August 2020, 25 consecutive patients underwent either an isolated PEARS procedure, PEARS with concomitant valve- and rhythm surgery or Ross-PEARS in a single center. Isolated PEARS was performed off-pump under controlled hypotension. Patient characteristics, echocardiographic and computed tomographic data were assessed.

Results
Median age was 37.5 (SD±14.7) years and 17 (68%) were male. Among all patients 44% had Marfan syndrome and 16% Loeys-Dietz syndrome. Seventeen (68%) patients underwent isolated PEARS, 6 (24%) a Ross-PEARS and 2 (8%) PEARS with concomitant surgery. Mean aortic root diameter prior to surgery was 45.1 mm (SD±5.1). All but one patient had a successful placement of the PEARS. This patient was converted to valve-sparing root replacement plus coronary artery bypass graft on the proximal right coronary artery due to a dissection of the aortic root and right coronary ostium (RCA). Reoperation was necessary in 3 (12%) because of pericardial effusion and in one case because of a false aneurysm of the autograft near the RCA (Ross-PEARS patient). Mean follow-up was 4 months (SD±4). No death, endocarditis and thromboembolic complications occurred. At follow-up aortic diameters were stable or reduced (median 39.5 mm (IQR 36-42)).

Conclusion
PEARS, a technically demanding but promising procedure regarding stabilization of aortic root diameters, has acceptable results at early follow up. However, longer follow up is needed to assess incidence of late complications.



Abstract

13.19 uur

EVIDENCE FOR CONTACT ACTIVATION AFTER IMPLANTATION OF A LEFT VENTRICULAR ASSIST DEVICE IN PATIENTS WITH END-STAGE HEART FAILURE

O.C.D. Liesdek[1], R.T. Urbanus[2], S. de Maat[3], L.M. de Heer[1], S.A.E. Sebastian[3], N. de Jonge[4], A. Vink[5], K. Fischer[2], C. Maas[3], W.J.L. Suyker[1], R.E.G. Schutgens[2].
[1]Department of Cardiothoracic Surgery, [2]Van Creveldkliniek, [3]Central Diagnostic Laboratory, [4]Cardiology and [5]Pathology, University Medical Center Utrecht, Utrecht University, Utrecht, the Netherlands.

Purpose
Thrombus formation is a common complication during Left Ventricular Assist Device (LVAD) therapy. It is likely that activation of the contact system by artificial surfaces of LVADs contributes to the prothrombotic effects of these devices. Evidence to support this theory is lacking. This study aims to evaluate contact system activation in patients before and after LVAD implantation.

Methods
Plasma levels of the contact system activation marker cleaved-H kininogen (cHK) and of the coagulation marker thrombin-antithrombin (TAT)-complexes were determined prior to LVAD implantation and 1 month, 6 months and 12 months thereafter in 40 adults with end-stage heart failure. A Longitudinal analysis was performed.

Results
Plasma from patients who received a LVAD between 2011 and 2018 was used. Two different centrifugal flow pumps (Heartmate III (N=13) and Heartware (N=8)) and an axial flow pump (Heartmate II N=19) were implanted. After LVAD implantation, plasma cHK levels increased over time ($p<0.0001$, figure 1A). This was accompanied by an increase of plasma TAT-complex levels ($p<0.0001$, figure 1B).

Conclusion
This study provides the first measured evidence of contact activation following LVAD implantation. This information could open up possibilities for anticoagulant therapy targeting the contact system.

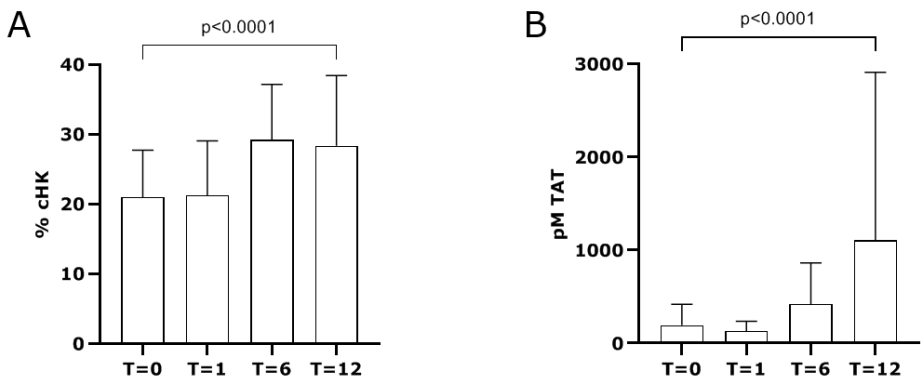


Figure 1: A/B. Plasma cleaved H-kininogen levels and plasma thrombin-antithrombin complex levels in patients before and after LVAD implantation. Data represent mean and 95% CI.
cHK, cleaved H-kininogen. TAT, thrombin-antithrombin. pM, picomolar. T=0, prior to LVAD implantation. T=1, T=6, T=12 represents 1, 6 and 12 months after LVAD implantation, respectively.

Abstract

13.27 uur

CARDIOMYOCYTE TOXICITY OF STATINS

T Somers[1,2,3]; S. Siddiqi[1,3]; FGM Russel[2,3]; AFTM Verhagen[1]; TJJ Schirris[2,3]; WJ Morshuis[1]
[1]*Department of Cardio-Thoracic Surgery, Radboud University Medical Center, Nijmegen;* [2]*Department of Pharmacology and Toxicology, Radboud Institute for Molecular Life Sciences, Radboud University Medical Center, Nijmegen;* [3]*Radboud Center for Mitochondrial Medicine, Radboud University Medical Center, Nijmegen*

Purpose
Statins are the most widely used drugs for cardiovascular diseases, as they significantly reduce major cardio- and cerebrovascular events on a vascular level. Musculoskeletal symptoms are the most debilitating adverse effects, experienced by 7–29% of all users. They are associated with inhibition of the third mitochondrial respiratory complex. However, less is known about the effects of statins in cardiac muscles. In the current era of population aging and increased disease complexity, insights in effects of statins on cardiomyocyte function is essential for clinical decision making. Therefore, we aim to investigate effects of statins on cardiomyocytes (CMs).

Methods
Metabolic effects of 48h statin exposure on CMs are evaluated using cell viability assays and intracellular microscopic pH measurements. Additionally, oxygen consumption (OCR) and extracellular acidification rate (ECAR) are measured with Seahorse XF-96 Flux Analyzer.

Results
The cell viability of the CMs declined with increasing dosage of all statins. Simvastatin lactone showed the highest toxicity rates, whereas cerivastatin acid was the most potent inducer of cytotoxicity. Interestingly, both rosuvastatin and cerivastatin demonstrated a bi-phasic decline in cell viability (Figure 1). Statins also dose-dependently decreased both ECAR and OCR in CMs.

Conclusion
This study demonstrates that statins induce cytotoxicity in CMs. The bi-phasic nature of this effect gives rise to the hypothesis that statins inhibit the monocarboxylate transporter at low concentrations and increased cellular penetration with inhibition of the mitochondrial oxidative phosphorylation system at higher concentrations. These results and hypothesis warrant further research and may suggest statins negatively influence long-term cardiac function.

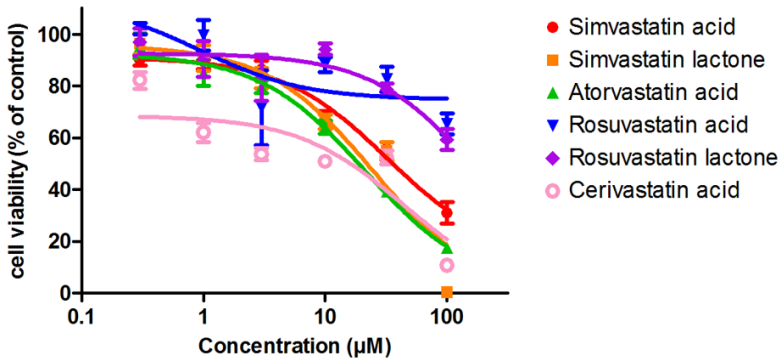


Figure 1. Cell viability curves corrected for control (DMSO only) in cardiomyocytes exposed to different statins for 48 hours.

Abstract

13.35 uur

PERSISTENT VERSUS PAROXYSMAL ATRIAL FIBRILLATION, THREE YEAR FOLLOW UP AFTER MINIMALLY INVASIVE PULMONARY VEIN AND POSTERIOR BOX ISOLATION, USING A CONTINUOUS LOOP MONITOR TO DETERMINE PREOPERATIVE CLASSIFICATION AND POSTOPERATIVE RESULTS

M.A.P. Oudeman, C.L. Kok, A. Tjon, S. Bemelmans-Lalezari, J.A. Huijgen, A. Mijnen-Schra, G.S. De Ruiter, E.C. Verbeek
Department of Cardiothoracic Surgery, OLVG, Amsterdam, The Netherlands, Department of Cardiology, OLVG, Amsterdam, The Netherlands

Purpose
The objective of this study was to describe the three year results of patients with persistent or paroxysmal atrial fibillation (PAF) after surgical pulmonary vein and posterior box isolation, using a continuous loop monitor (CLM).

Methods
In 105 patients with AF a CLM was implanted to determine preoperative burden and type of AF. Four weeks after CLM implantation patients underwent minimally invasive pulmonary vein and posterior box isolation. Patients were followed up to 36 months using the CLM. The first three months after surgery were considered as blanking period. Primary endpoint was defined as having sinus rhythm (SR) without the use of antiarrhythmic drugs (AAD) in all 36 months post-surgery. Secondary endpoint included all patients in SR still using AAD.

Results
In total 105 patients were included for analysis, 53 were classified as having persistent AF, and 52 patients were classified as having PAF. In total 72.4% of patients were free of AF and AAD 36 months after surgery, 90.4% of PAF patients and 54.7% of persistent AF patients. When patients without AF but with AAD are included, these numbers rise to 80.0% (PAF 94.2%, 66.0% persistent AF). In 21 patients a supraventricular arrhythmia was detected by the CLM at some point during the 36 month follow-up. Of these 21 patients, 11 underwent additional percutaneous ablation.

Conclusion
Pulmonary vein and posterior box isolation showed excellent results in patients with PAF and even in patients with persistent AF after 36 months. A CLM is a valuable tool in preoperative classification of atrial fibrillation and postoperative follow-up.

	Total, N = 105 (%)		**PAF, N = 52 (%)**		**Persistent, N = 53 (%)**	
Success	**84**	**(80,0)**	**49**	**(94,2)**	**35**	**(66,0)**
without AAD	76	(72,4)	47	(90,4)	29	(54,7)
with AAD	8	(7,6)	2	(3,8)	6	(11,3)
Failure	**21**	**(20,0)**	**3**	**(5,8)**	**18**	**(34,0)**
with re-ablation	11	(10,5)	1	(1,9)	10	(18,9)
without re-ablation	10	(9,5)	2	(3,9)	8	(15,1)

Abstract

13.43 uur

FIRST EVIDENCE OF ATRIAL CONDUCTION DISORDERS IN PEDIATRIC PATIENTS WITH CONGENITAL HEART DISEASE BEFORE THE FIRST YEAR OF LIFE

R.K. Kharbanda[1, 2]; M.S. van Schie[2]; N.L. Ramdat Misier[2]; W.J. van Leeuwen[1], MD; Y.J.H.J. Taverne[1]; P.C. van de Woestijne[1]; J.A.E. Kammeraad[3]; B. Bartelds[3]; N.M.S. de Groot[2]; A.J.J.C. Bogers[1]
[1] *Department of Cardiothoracic Surgery, Erasmus Medical Center, Rotterdam, the Netherlands*
[2] *Department of Cardiology, Erasmus Medical Center, Rotterdam, the Netherlands*
[3] *Department of Pediatrics, Division of Pediatric Cardiology, Erasmus Medical Center, Sophia Children's Hospital, Rotterdam, the Netherlands*

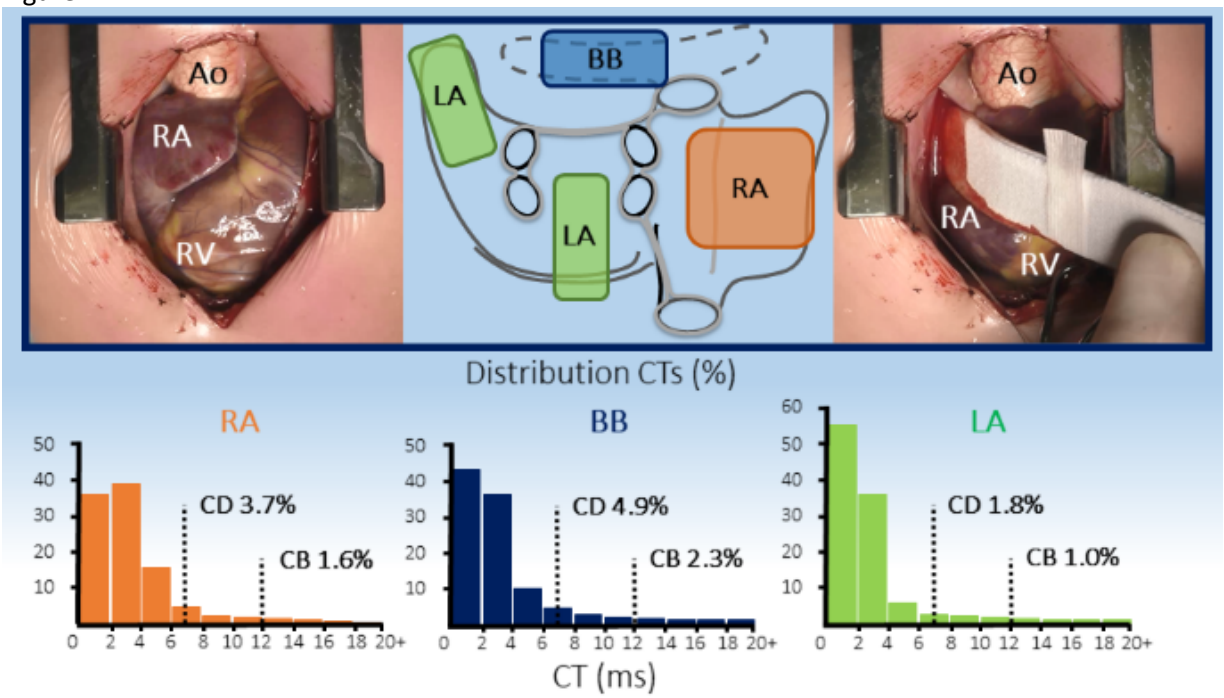
Purpose
In order to investigate the early effects of short-lasting volume/pressure overload on atrial conduction properties, we conducted epicardial high-density mapping in pediatric congenital heart disease (CHD) patients undergoing primary open-heart surgery.

Methods
Ten pediatric CHD patients (median age=6 months [3-43]) scheduled for repair of atrial septal defect type II (n=1), ventricular septal defect (n=7, 3 of them also have an atrial septal defect type II), complete atrioventricular septal defect (n=1) and sinus venosus defect (n=1) were included in this study. Epicardial mapping of the right atrium (RA), Bachmann's bundle (BB) and the left atrium (LA) was performed (upper panel Figure 1). Conduction delay (CD) and block (CB) were defined as interelectrode conduction time (CT) differences of 7-11ms and ≥12ms, respectively.

Results
All patients showed some degree of CD or CB (defined as percentage of mapped region), particularly at BB (CD=4.9% and CB=2.3%) followed by the RA (CD=3.7% and CD=1.6%). The least amount of CD and CB was observed in the LA (respectively 1.8% and 1.0%). The lower panel of Figure 1 demonstrates the frequency distribution of CTs for all patients specified per atrial region. Most severe conduction disorders, presented as highest CTs measured at the RA, BB and the LA were 44, 25 and 23ms, respectively.

Conclusion
Our study demonstrates that atrial conduction abnormalities are already present in pediatric CHD patients before surgical correction. Over time, surgical scar tissue, ageing and volume/pressure overload may aggravate slowing of atrial conduction thereby predisposing CHD patients to atrial arrhythmias early in life.

Figure 1.



Ao= Aorta, BB= Bachmann's bundle, CB= Conduction block, CD= Conduction delay, LA= Left atrium, ms= Milliseconds, RA= Right atrium, RV= Right ventricle.

Video Abstract

13.51 uur

TOTALLY THORACOSCOPIC ABLATION: A UNILATERAL RIGHT-SIDED APPROACH

J.A. Fleerakkers, F.N. Hofman, B.P. van Putte
Sint-Antonius Ziekenhuis, Nieuwegein

Purpose
A unilateral approach for totally thoracoscopic ablation and left atrial appendage closure for the treatment of atrial fibrillation.

Methods
Retrospective case series.

Results
No intraoperative complications or conversions. At 3-months, 85% were in sinus rhythm. No neurological events were recorded. Complete closure of the left atrial appendage in all.

Film te downloaden op: https://we.tl/t-zq7XcKibmy (hoge kwaliteit – 533Mb)

Abstract

13.59 uur

RECOVERY OF CONDUCTION DISORDERS AFTER PERCEVAL SUTURELESS AORTIC VALVE REPLACEMENT

N.M.A.J. Timmermans, K.Y. Lam, F. Akca, M.E.S.H. Tan, N.J. Verberkmoes, M.A. Soliman-Hamad, A.H.M. van Straten.
Catharina Ziekenhuis, Eindhoven

Purpose
Conduction disorders and permanent pacemaker (PPM) implantation after surgical aortic valve replacement (AVR) are well-recognized complications. However, in sutureless valve prostheses, it remains unknown whether PM-dependency and conduction disturbances resolve over time. Our aim was to evaluate whether conduction disorders after Perceval sutureless valve implantation recover during follow-up.

Methods
Patients undergoing isolated surgical AVR or concomitant AVR with coronary artery bypass surgery using the Perceval sutureless valve, between January 2010 and July 2018 were included. Postoperative electrocardiogram (ECG) findings were analyzed to determine the incidence of new-onset left bundle branch blocks (LBBBs) and the requirement for PPM implantation. During a postoperative period of 6 till 18 months, ECG findings during PPM check were analyzed to determine PM-dependency and LBBB persistence.

Results
Out of 184 patients who received a Perceval prosthesis during the study period, 39 (21.2%) patients developed new-onset LBBB and 10 patients (5.4%) received a PPM postoperatively. Occurrence of conduction disorders was not associated with valve size. Follow-up was completed in 176 (95.7%) patients. In patients with a new-onset LBBB 35.9% recovered during follow-up. (P = 0.001). Seven out of ten (70%) patients remained pacemaker dependent.

Conclusion
After Perceval aortic valve implantation, new-onset LBBB recovers in over one-third of patients during follow-up. In patients who needed a postoperative PPM, the majority remained PM dependent.

Abstract

14.07 uur

MITRAL VALVE REPAIR VERSUS REPLACEMENT IN THE ELDERLY: A PROPENSITY WEIGHTHED ANALYSIS

K. Ko, T.L. de Kroon, K.F. Schut, J.C. Kelder, N. Saouti, B.P. van Putte
St. Antonius Ziekenhuis, Nieuwegein

Purpose
The disadvantages of mitral valve replacement with a bioprosthesis in the long-term may not play an important role if the shorter life expectancy of elderly patients is taken into account. This study aims to evaluate whether mitral valve replacement in the elderly (>70years) is associated with similar outcome compared to repair.

Methods
All patients aged 70 years and older undergoing minimally invasive mitral valve surgery for mitral regurgitation in our institution were studied retrospectively. Primary outcome was the 30-day complication rate of replacement versus repair, and secondary outcome was long-term survival and freedom from re-operation of replacement versus repair.

Results
237 Patients underwent surgery (138 replacement and 99 repair) with a mean age of 76.4 ± 4.2years. 30-Day complications (replacement 73.2% versus repair 67.7%; p=0.358), 30-day mortality (replacement 3.6% versus repair 1.0%; p=0.237) and stroke (replacement 1% versus repair 0%; p=0.987) were similar in both groups. Long-term survival (mean follow-up: 6.4 ± 3.1 years) of replacement was similar to repair after propensity weighting. Higher age, diabetes and left ventricular dysfunction were independent predictors for reduced long-term survival in both groups. Freedom from re-operation at 5-years (replacement 99.1 ± 0.9% versus repair 96.7 ± 1.9%; p=0.395) and 10-years follow up (replacement 94.8 ± 4.3% versus repair 94.8 ± 2.7%; p=0.395) was similar in both groups.

Conclusions
Mitral valve replacement shows similar short- and long-term outcome compared to repair in patients above 70 years old in minimally invasive mitral valve surgery. Trials are needed to confirm these results, suggesting to lower the threshold for replacement in elderly patients.