

Sessie 6 Congenital cardiology

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Abstract sessies Online NVVC Najaarscongres Donderdag 5 en vrijdag 6 november 2020

First Results of a Dutch Cohort of Patients Undergoing Personalized External Aortic Root Support.

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Department: Cardiothoracic Surgery

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Purpose:

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

Patients with connective tissue disease with aortic root aneurysm are at risk of dissection and progression of the dilatation. Standard treatment of aortic root aneurysm is either a Bentall procedure or valve-sparing root replacement. Both procedures have drawbacks as the need for anticoagulation and complications of the aortic valve as insufficiency or endocarditis. Personalized External Aortic Root Support (PEARS) has been introduced to reduce these risks with a similar beneficial outcome on aortic complications.

Methods:

From January 2018 to August 2020, 25 consecutive patients underwent either an isolated PEARS procedure or a PEARS with concomitant valve- and rhythm surgery or a Ross-PEARS procedure in a single center. Isolated PEARS was performed off-pump under controlled hypotension. Patient characteristics, preoperative and postoperative echocardiographic and computed tomographic or magnetic resonance imaging 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, 16% Loeys-Dietz syndrome and 20% had a bicuspid aortic valve. Seventeen (68%) patients underwent isolated PEARS, 6 (24%) a Ross-PEARS and 2 (8%) PEARS with concomitant surgery (Mitral valve plasty (MVP), left atrial appendage amputation (LAAA) and left maze for one patient and a MVP, tricuspid valve plasty, pulmonary vein isolation, LAAA and right atrial appendage amputation for the other). Mean aortic root diameter at the level of the sinus of Valsalva prior to surgery was 45.1 mm (SD±5.1). All but one patient had a successful placement of the PEARS. Two patients (in the isolated PEARS group) were converted to cardiopulmonary bypass. One of them was also converted to a valve-sparing root replacement plus coronary artery bypass graft on the proximal right coronary artery due to a local 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 thrombo-embolic complications occurred. At follow-up all aortic diameters were stable or even reduced (median 39.5 (IQR 36-42)).

Conclusion:

The PEARS procedure, 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 the incidence of late aortic complications.

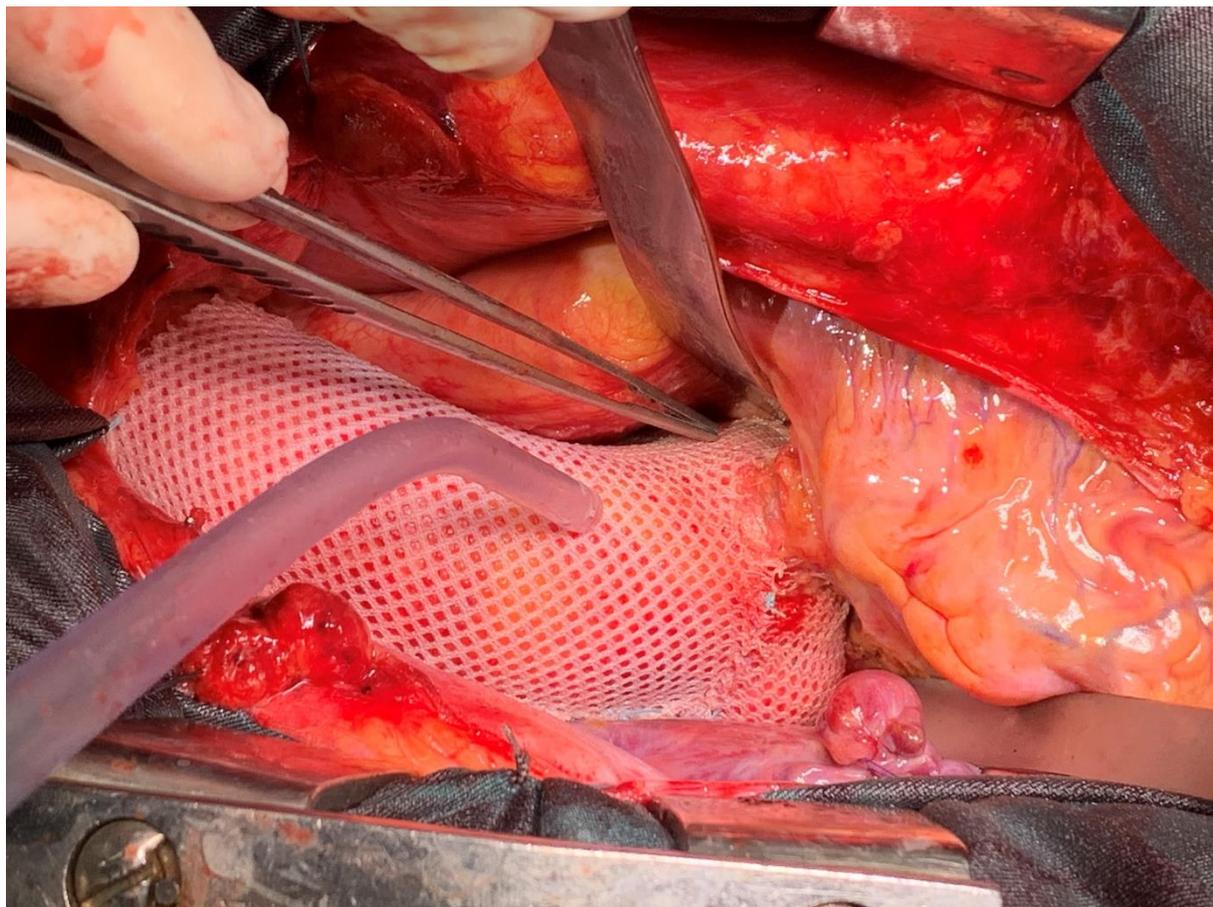
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Keywords:

Aortic root aneurysm, Marfan patients, Aortic dissection

Figure:

PEARS in situ



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Male-Female Differences in Acute Type B Aortic Dissection: the DisSEXion Study

Presenting author: F. Meccanici

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Purpose:

Acute type B aortic dissection (TBAD) is a cardiovascular emergency with high risk of morbidity and mortality. The aim of this study was to identify differences between male and female TBAD patients in presentation, management and outcomes.

Methods:

A retrospective cohort study was conducted including all consecutive patients who presented with TBAD between 2007-2017 in three tertiary centers. Traumatic dissections and chronic dissections were excluded.

Results:

The study population consisted of 242 patients, of which 40% (n=97) was female. In comparison to males, females presented at an older age (67 [IQR:56-74] versus 61 [IQR:52-70], $p=0.01$) and male patients more often had a history of aortic surgery (19% vs 9%; $p=0.05$). Imaging diagnostics implied more distally extended dissections in males: DeBakey type IIIb was diagnosed more frequently ($p=0.06$) as was renal artery involvement ($p=0.02$). Endovascular treatment was performed in 41% of males versus 43% of females ($p=0.70$). Furthermore, 30-day mortality was 12% in male patients and 7% in female patients ($p=0.35$). There was no significant difference in late mortality with a median follow-up duration of 5 year (73% versus 75% at 5 years; $p=NS$; Figure 1).

Conclusion:

The male-female differences found in this study might imply different disease processes and/or referral patterns. These findings can lead to better diagnosis of TBAD patients and more individualized treatment for both males and females. Male-female specific reporting in TBAD studies is recommended to fill the current knowledge gap.

Keywords:

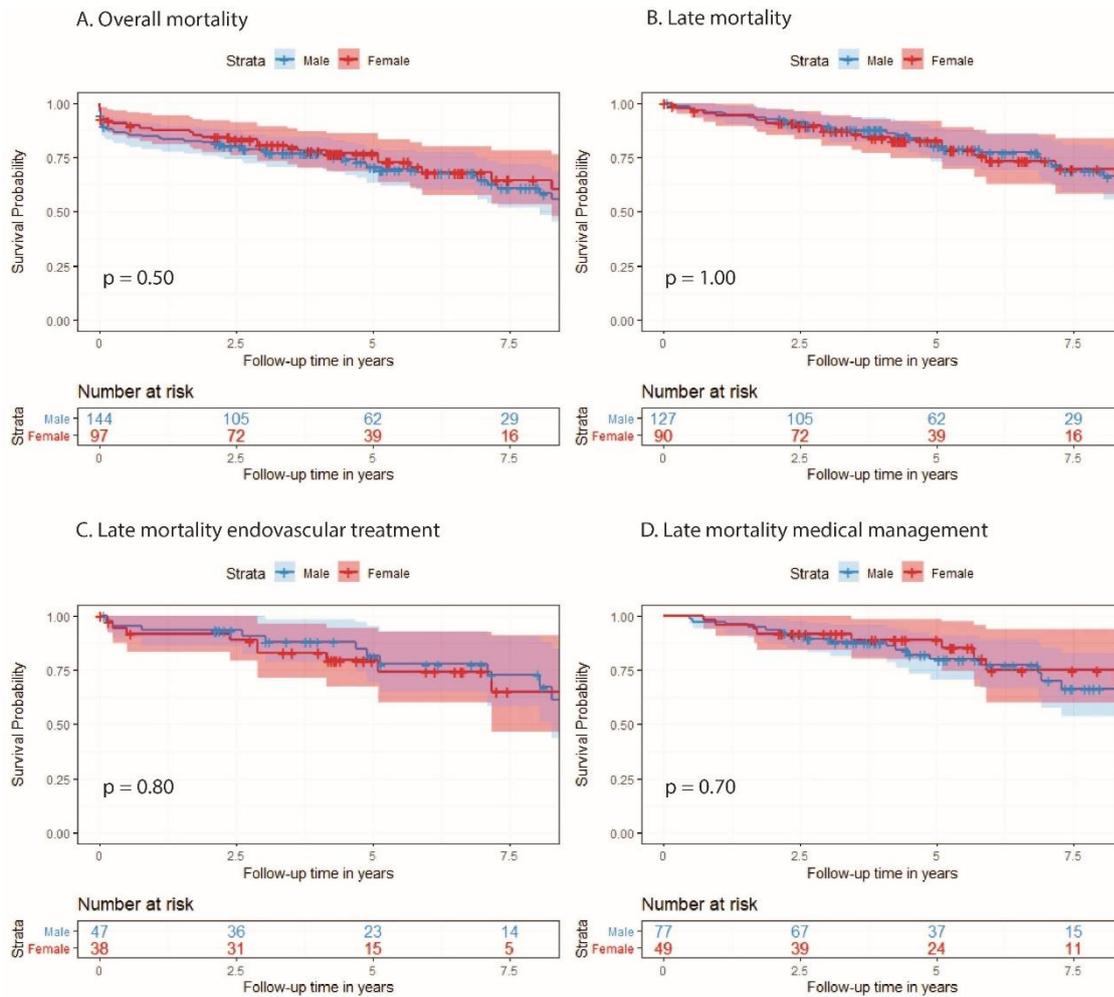
Acute Aortic Dissection, Sex and Gender, Thoracic Aorta

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Figure:

Figure 1. Kaplan Meier estimates for mortality stratified by sex



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Cardiovascular Morbidity and Mortality in Adult Patients with Repaired Aortic Coarctation

Presenting author: T.A. Meijs

Department: Cardiology

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Purpose:

The long-term burden of cardiovascular disease after repair of coarctation of the aorta (CoA) remains unclear. In this large, prospective cohort, we aimed to determine the incidence of cardiovascular events and mortality in adult CoA patients. Furthermore, we aimed to identify risk factors for the occurrence of cardiovascular events.

Methods:

Adults with previous CoA repair from 5 tertiary referral centers were selected from the Dutch CONgenital CORvitia (CONCOR) registry. Cardiovascular events included coronary artery disease, stroke/TIA, aortic complications, arrhythmias, heart failure hospitalizations, endocarditis, and cardiovascular death.

Results:

In total, 920 CoA patients (median age 24 years [range 16-74 years]) were included. During a mean follow-up of 9.3 ± 5.1 years, 270 cardiovascular events occurred in 191 patients, of which aortic complications and arrhythmias were most frequent. All-cause mortality was increased compared to an age- and sex-matched general population (standardized mortality ratio: 3.3 [95% CI 2.3-4.4]; $p < 0.001$). In Cox proportional-hazards regression, older age at initial CoA repair (HR 1.017 [95% CI 1.000-1.033]; $p = 0.048$) and elevated left ventricular mass index (LVMI; HR 1.009 [95% CI 1.005-1.013]; $p < 0.001$) were independently associated with an increased risk of cardiovascular events.

Conclusion:

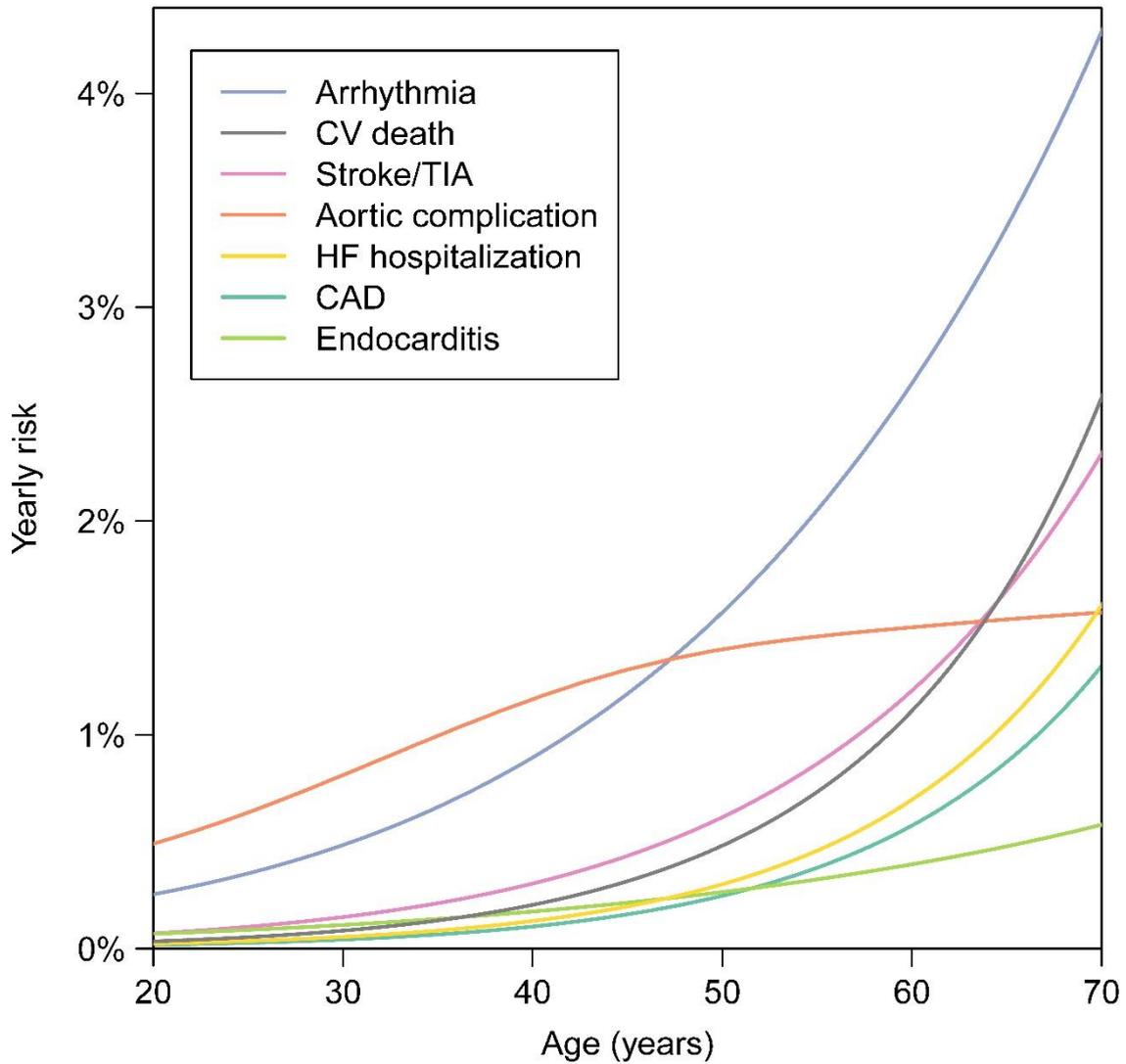
This large cohort of adult CoA patients showed a high burden of cardiovascular events, particularly aortic complications and arrhythmias, and substantially reduced survival during long-term follow-up. Older age at initial CoA repair and elevated LVMI were independent risk factors for the occurrence of cardiovascular events. These results may aid in risk-stratification and emphasize the need for optimization of preventive strategies.

Keywords:

aortic coarctation, adult congenital heart disease, prognosis

Figure:

Estimated yearly risk of specific types of cardiovascular events by age. The hazard functions represent smoothed estimates based on B-splines. CAD, coronary artery disease; CV, cardiovascular; HF, heart failure; TIA, transient ischemic attack.



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Serial MRI-based Right Ventricular Mechanical Wall Stress Measurements and Their Association with Right Ventricle Function in Patients with Repaired Tetralogy of Fallot

Presenting author: S.C.S. Minderhoud

Department: Cardiology

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Purpose:

Timing of PVR to prevent right ventricular (RV) dysfunction in TOF patients remains challenging. Wall stress (WS) might be an early marker of RV dysfunction. We aimed to develop a patient-specific WS model, to investigate regional variation of WS, change over time and the association with functional parameters in TOF patients.

Methods:

Ten repaired TOF patients with pulmonary regurgitation (PR)(≥moderate) before PVR were included (age at baseline 24(IQR 16-28)years, 50%male, FU-period 7.0(IQR 5.8-7.3) years). MRI-based patient-specific computational-ventricular models were created with short-axes-based geometry and echo-derived pressures at two time points (figure). Mid-diastolic WS in the RV free wall was analysed globally and regionally.

Results:

Mean WS in the mid region was 1.69kPa higher than in the basal region ($p < 0.01$, 95%CI-1.99;-0.11) and was 1.05kPa higher than in the apical region ($p = 0.03$, 95%CI-2.53;-0.83)). WS increased more in the mid region compared to basal and apical region during follow-up. Patients with more severe PR at baseline demonstrated a higher increase of global WS ($p = 0.02$), especially in the lateral free wall. Cross-sectionally, higher global WS was associated with lower RVEF, independently of LVEF and RVEDV (decrease in RVEF of 1.29% per kPa increase WS, $p = 0.01$), most prominently in the anterior, basal and mid part. WS was not associated with NT-proBNP, or exercise capacity(% predicted workload).

Conclusion:

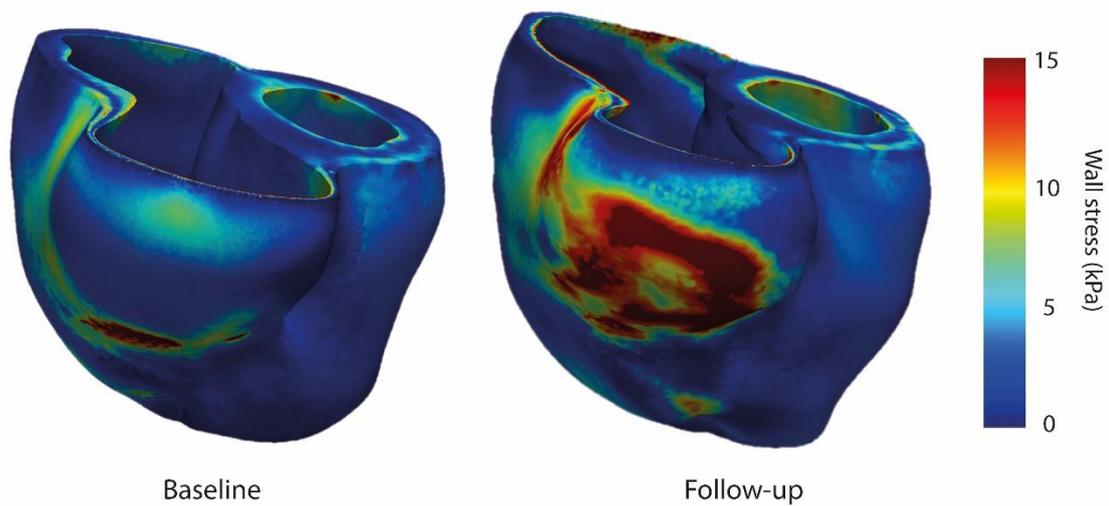
This novel method enabled to calculate WS in complex-shaped ventricles with high accuracy. WS was independently associated with RVEF in patients with TOF, with clear regional differences. WS assessment may be a useful addition in determining the optimal timing for TOF repair.

Keywords:

Tetralogy of Fallot, Wall stress, Pulmonary valve replacement

Figure:

Wall stress distribution in a patient with repaired Tetralogy of Fallot, with a pulmonary regurgitation fraction of 42% at baseline and free wall right ventricular wall stress values of a) 3.1 kPa (IQR 2.4 to 4.0) at baseline and b) 4.5 kPa (IQR 3.3 to 5.9) at follow-up with a follow-up period of 7 years.



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Can Patient Education via Virtual Reality Reduce Anxiety in Patients undergoing a PFO or ASD Closure?

Presenting author: M.D. Oudkerk Pool
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Purpose:

The purpose of this study was to alleviate pre-procedural anxiety in patients undergoing percutaneous patent foramen ovale (PFO) or atrial septal defect (ASD) closure using a Virtual Reality (VR) film as an extra patient education modality next to the scheduled outpatient clinic visit.

Methods:

Patients were randomized to either the VR-group or the control group. The control group received traditional patient information by their cardiologist. The intervention group additionally viewed a 4-minute VR-film, that was designed to create a representative patient-experience of the day of the procedure. The primary outcome was patient anxiety, as measured with anxiety scores derived from the State Trait Anxiety Inventory (STAI) questionnaire. The questionnaires were answered directly after the informed consent visit and one week prior to the procedure.

Results:

In total 40 patients have been included (mean age = 45 yrs \pm 11, male = 21), mean FU duration = 37 days \pm 23). So far, 27 patients (VR-group n = 14; control group n = 13) completed follow-up. At baseline the control and intervention group were equally anxious (37 \pm 9 vs 38 \pm 14). During follow-up a significant increase in anxiety in the control group was found (37 \pm 9 vs 46 \pm 12; p = 0.034; figure 1), whereas anxiety in the VR-group remained unchanged (38 \pm 14 vs 36 \pm 9; figure 1). One week prior to the procedure, the control group was significantly more anxious compared to the VR group (+ 11 \pm 4; p = 0.012).

Conclusion:

Our results demonstrate that VR patient education is effective in alleviating anxiety prior to the PFO or ASD procedure.

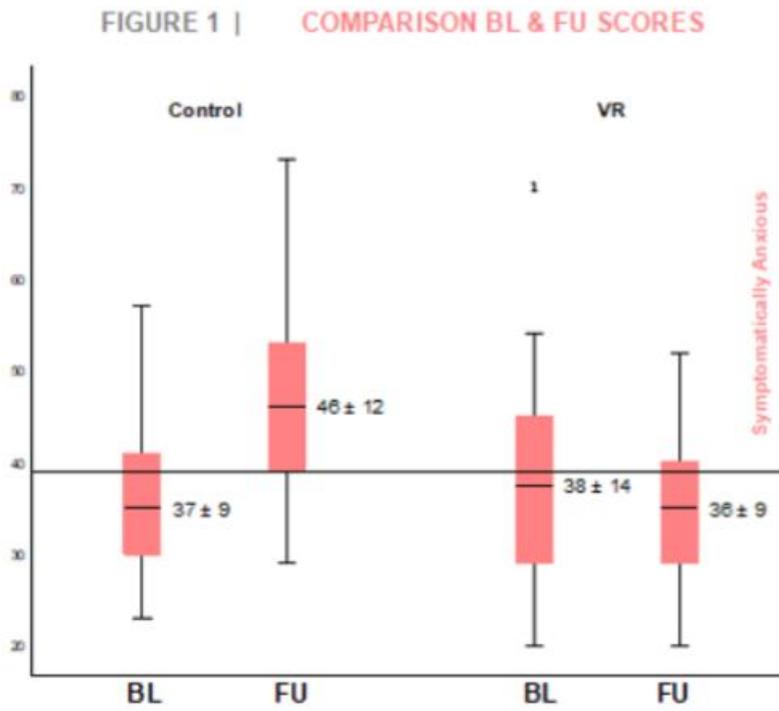
Keywords:

Virtual reality, Patent foramen ovalen, Atrial septal defect

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Figure:

Comparison BL & FU scores based on State Trait Anxiety Inventory (STAI) questionnaire



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Medication in Adults after Atrial Switch for Transposition of the Great Arteries: Clinical Practice and Recommendations

Presenting author: O.I. Woudstra

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Purpose:

Heart failure is the main threat to long-term health in adults with transposition of the great arteries(TGA) corrected by an atrial switch operation(AtrSO). Current guidelines refrain from recommending heart failure medication in TGA-AtrSO, as there is insufficient data to supporting that it is beneficial. Medication is therefore prescribed based on personal judgements. We aimed to evaluate medication use in TGA-AtrSO patients and examine the association of use of Renin-Angiotension-Aldosteron System(RAAS) inhibitors and β -blockers with long-term survival.

Methods:

We identified 150 TGA-AtrSO patients(median age 30 years[IQR 25-35], 63% male) of the CONCOR-registry from 5 medical centers in the national Dispensed Drug Register(2006-2014). Data on patients medication use were extracted. Time-varying Cox marginal structural models that adjusted for confounding medication were used to analyze risk of all-cause mortality.

Results:

Use of RAAS inhibitors, β -blockers, and diuretics increased with age, from respectively 21%[95%CI 14-40], 12%[95%CI 7-21], and 3%[95%CI 2-7] at age 25, to 49%[95%CI 38-60], 51%[95%CI 38-63], and 41%[95%CI 29-54] at age 45. Mortality risk was lower with use of RAAS inhibitors and β -blockers in symptomatic patients(HR=0.13[95%CI 0.03-0.73];p=0.020 and HR=0.12[95%CI 0.02-0.17];p=0.019, respectively). However, in the overall cohort, no benefit of RAAS inhibitors and β -blockers was seen(HR=0.93[95%CI 0.24-3.63];p=0.92 and HR=0.98[0.23-4.17];p=0.98, respectively).

Conclusion:

The use of heart failure medication is high in TGA-AtrSO patients, although evidence of its benefit is limited. This study showed lower risk of mortality with use of RAAS inhibitors and β -blockers in symptomatic patients only. These findings can direct future guidelines, supporting use of RAAS inhibitors and β -blockers in symptomatic, but not asymptomatic patients.

Keywords:

Transposition of the great arteries, Dispensed drugs, Heart failure