Abstract sessie NVVC Voorjaarscongres
Donderdag 20 april 2023
15:00 – 16:30 uur

SESSIE 2: GENERAL & HEART FAILURE

Zaal: Sorbonne 2	Voorzitters: drs. Casper Eurlings, cardioloog, Laurentius Ziekenhuis en drs. Niels Jongejan, physician assistant, Stichting QuaRijn
Spreker 1:	**Atrial Fibrillation Detected with Outpatient Cardiac Rhythm Monitoring in Patients with Ischemic Stroke or TIA of Undetermined Cause** *M.F.L. Meijs (Medisch Spectrum Twente, Enschede)*
Spreker 2:	**The Use of a Simple Cardiac Triage Unit as a Safe Alternative to Direct Specialized Evaluation of Patients Estimated at Low Risk for Complex Care** *S. J. Heuving (Treant, Emmen)*
Spreker 3:	**The Effect of Resveratrol on Aortic Growth and Function in Patients With Marfan Syndrome** *D. Bosshardt (Amsterdam UMC, Amsterdam)*
Spreker 4:	**Attainment of Recommended LDL-C Goals after Percutaneous Coronary Intervention in Real-world Practice** *D.A.M. Peeters (Radboud University Medical Centre, Nijmegen)*
Spreker 5:	**The Dynamic Risk of Heart Failure: a Systematic Review and Meta-regression of Observational Studies** *A. Shakoor (Erasmus University Medical Centre, Rotterdam)*
Spreker 6:	**Changes in Diagnostic Trajectory of Cardiac Amyloidosis over 6 Years: Role of Improving Awareness** *A. Achten (MUMC+, Maastricht)*
Spreker 7:	**Referral Patterns for Advanced Heart Failure Therapies** *R. van der Hoorn – Huisman (Erasmus MC, Rotterdam/Hagaziekenhuis, Den Haag)*

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Atrial Fibrillation Detected with Outpatient Cardiac Rhythm Monitoring in Patients with Ischemic Stroke or TIA of Undetermined Cause

Presenting author: M.F.L. Meijs
Department: Cardiology

G. van der Maten (Medisch Spectrum Twente, Enschede); G. van der Maten (Medisch Spectrum Twente, Enschede); M.F.L. Meijs (Medisch Spectrum Twente, Enschede); J. van der Palen (Medisch Spectrum Twente, Enschede); P.J.A.M. Brouwers (Medisch Spectrum Twente, Enschede); C. von Birgelen (Medisch Spectrum Twente, Enschede); J. van Opstal (Medisch Spectrum Twente, Enschede); M.H. den Hertog (Isala, Zwolle)

Purpose:
Guidelines advise cardiac rhythm monitoring for ≥3 days to detect atrial fibrillation (AF) in patients with ischemic stroke of undetermined cause. However, the optimal duration of monitoring is unknown. We aimed to determine the AF detection rate during 7 days of outpatient cardiac rhythm monitoring after ischemic stroke or transient ischemic attack (TIA) of undetermined cause and gain insights into the AF-patients' vascular risk factors.
Methods:
Participants from a large tertiary hospital underwent outpatient cardiac rhythm monitoring after negative standard diagnostic evaluation (i.e., 12-lead electrocardiogram and in-hospital telemetry). Primary outcome was the proportion of patients with newly detected AF.
Results:
We examined 373 patients [age: 67.8±11.6 years; women: 166(44.5%); ischemic stroke: 278(74.5%)]. Median monitoring duration was 7 days (IQR 7-7), performed after a median of 36 days (IQR 27-47). AF was detected in 17(4.6%) patients, mostly (53%) on day-1. Within 3 days 73% of AF patients were identified. First AF episodes were detected up to day-7, but median time to AF was 8 hours (IQR 1-81). A significant difference in cardiovascular risk factors [diabetes; hypertension; or age >65 years] existed between the AF and non-AF group, and 12(70.6%) AF patients had ≥2 risk factors.
Conclusion:
After ischemic stroke or TIA of undetermined cause, 7 days of outpatient cardiac rhythm monitoring detected new AF in 4.6% of patients. Patients with AF had significantly more cardiovascular risk factors. About half of new AF episodes occurred during the first monitoring day, and about three quarters during the first 3 days.

Keywords:
Atrial Fibrillation, Brain Ischemia, Embolism

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The Use of a Simple Cardiac Triage Unit as a Safe Alternative to Direct Specialized Evaluation of Patients Estimated at Low Risk for Complex Care

Presenting author: S.J. Heuving
Department: Cardiology

S. J. Heuving (Treant, Emmen); S. J. Heuving (Treant, Emmen); M. van der Wielen (Treant, Emmen); L. Kleijn (Treant, Emmen); S.A. Kleijn (Treant, Emmen); R.L. Anthonio (Treant, Emmen); M.K. de Bie (Treant, Emmen)

Purpose:
Treant hospital centralized emergency care to one of their three locations. In order to combat crowding in the remaining Emergency Department (ED) / Cardiac Emergency Unit (CEU), whilst keeping emergency evaluation possible for all patients in its region of adherence, a Cardiac Triage Unit (CTU) was designed. This study evaluates the clinical and economical value of such a CTU in order to assess its potential in the rapidly transforming field of health care.
Methods:
For all patients needing emergency cardiac evaluation living in the area around Stadskanaal and Hoogeveen, presentation at the CTU was considered based on pre-specified criteria (figure 1). Recruitment period was July-December 2022. Outcome of patient care at the CTU and the usefulness of the current algorithm was assessed. Major adverse events were defined as death or acute coronary syndrome, minor adverse events as the need for readmission to CTU/ED/CEU.
Results:
198 patients were included. Most common referral reasons were chest pain (43.2%), palpitations (30.2%), and dyspnea (10.6%). Out of all presentations, 88.8% was discharged home the same day, not needing further evaluation. In the follow-up period of 30 days after initial presentation, major and minor adverse events occurred in 0.5% and 6.9% of the patients dismissed from the CTU, respectively.
Conclusion:
The use of a CTU is a safe alternative to direct admission to CEU for patients who are estimated to need low-complex care. Therefore, CTUs can limit CEU/ED crowding while keeping emergency evaluations possible for all patients

Keywords:
Acute Cardiovascular Care, Pre-hospital Triage, Cost Efficiency

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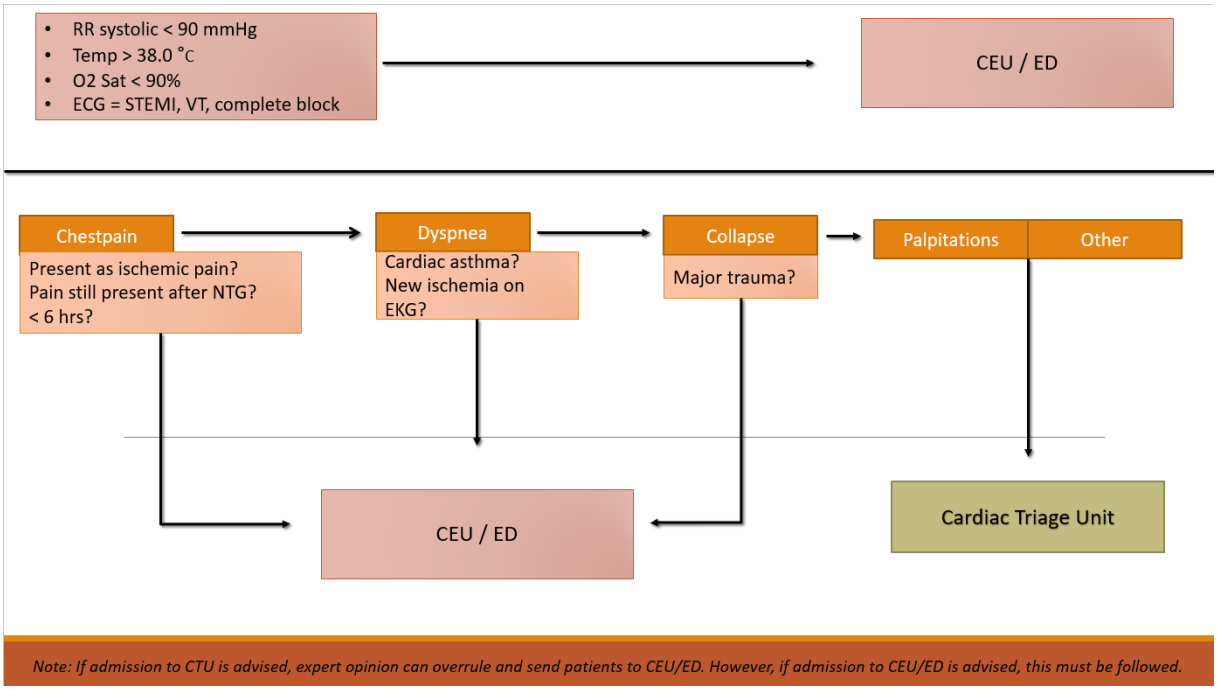
Figure:



Abstract sessie NVVC Voorjaarscongres
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15:00 – 16:30 uur

The Effect of Resveratrol on Aortic Growth and Function in Patients With Marfan Syndrome

Presenting author: D. Bosshardt
Department: Radiology & Cardiology

D. Bosshardt (Amsterdam UMC, Amsterdam); D. Bosshardt (Amsterdam UMC, Amsterdam); M.M. van Andel (Amsterdam UMC, Amsterdam); E.M. Schrauben (Amsterdam UMC, Amsterdam); L.M. Gottwald (Amsterdam UMC, Amsterdam); R.R.J. van Kimmenade (Radboud UMC, Nijmegen); A.J.H.A. Scholte (Leiden University Medical Center, Leiden); M.G. Dickinson (University Medical Center Groningen, Groningen); A.H. Zwinderman; B.J.M. Mulder (Amsterdam UMC, Amsterdam); A.J. Nederveen (Amsterdam UMC, Amsterdam); P. van Ooij (Amsterdam UMC, Amsterdam); M. Groenink (Amsterdam UMC, Amsterdam); V. de Waard (Amsterdam UMC, Amsterdam)

Purpose:
Patients with Marfan syndrome (MFS) have an increased risk of life-threatening aortic complications, mostly preceded by aortic dilatation. The aim of this study was to investigate if treatment with Resveratrol, a dietary supplement that intervenes in cellular metabolism, reduces aortic dilatation rate in patients with MFS.
Methods:
In this prospective, pre-post observational, multicenter trial, we analysed Resveratrol treatment in adults with MFS. Primary endpoint was the change in aortic dilatation in the thoracic aorta after one year of Resveratrol use, calculated using Magnetic Resonance Imaging (MRI) aorta diameters at three time points. Furthermore, we investigated changes in abnormal hemodynamics (wall shear stress (WSS) and pulse wave velocity (PWV)) determined by 4D-flow MRI. Assessments on risk factors were performed in patients with abnormal WSS or PWV.
Results:
A total of 57 participants, mean age of 37±9 years, of which 28 males (49%) were included in the study. Twenty-six (46%) had undergone aortic root replacement prior to the study. All aortic dimensions remained stable after 1.2±0.3 years follow-up. A significant decrease in growth rate (mm/year) in the ascending aorta was observed during the trial compared to pre-trial, from 0.54 (IQR: 0.09–1.39) to 0.00 (IQR: -0.99–0.67), p=0.004. WSS and PWV did not change after one year of Resveratrol use. High values of PWV were associated with previous aortic root replacement.
Conclusion:
In adult patients with MFS, Resveratrol treatment shows promising results towards stabilizing aortic growth rate after 1.2 year follow up. These findings may warrant a subsequent larger study with a longer follow-up period.

Keywords:
Marfan syndrome, Resveratrol, 4D Flow

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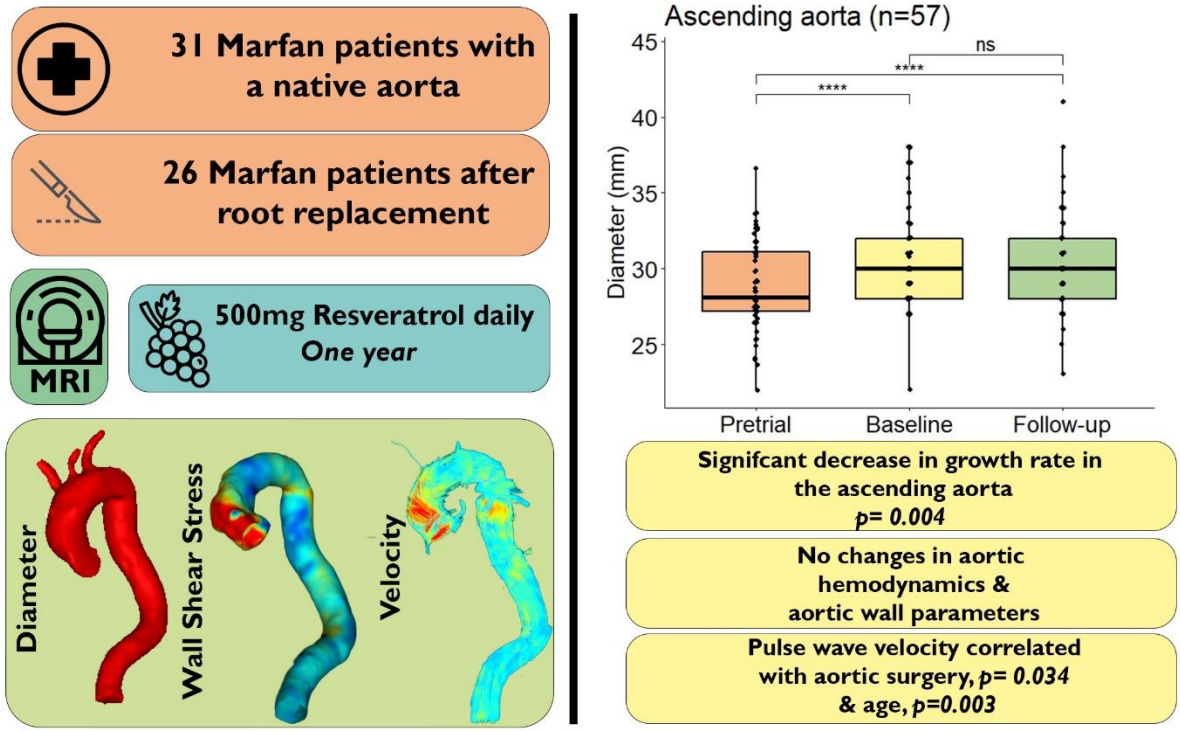
Figure:



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15:00 – 16:30 uur

Attainment of Recommended LDL-C Goals after Percutaneous Coronary Intervention in Real-world Practice

Presenting author: D.A.M. Peeters
Department: Cardiology

*D.A.M. Peeters (Radboud University Medical Centre, Nijmegen); D.A.M. Peeters (Radboud University Medical Centre, Nijmegen); E.C.I. Woelders (Radboud University Medical Centre, Nijmegen); J.J.P. Luijkx (Zuyderland Medical Centre, Heerlen); P.J.C. Winkler (Zuyderland Medical Centre, Heerlen); P. Damman (Radboud University Medical Centre, Nijmegen); W. Remkes (VieCuri Medical Centre, Venlo); A.W.J. van 't Hof (Maastricht University Medical Centre, Maastricht); R.J.M. van Geuns (Radboud University Medical Centre, Nijmegen); on behalf of the ZON-HR registry investigators**

Purpose:
Cholesterol management in patients after percutaneous coronary intervention (PCI) from the ''Zuid-Oost Nederland Hart Registratie'' (ZON-HR) was evaluated. The aim of this multi-center prospective registry is to improve secondary prevention after PCI by a patient-tailored approach.
Methods:
Since November 2020 real-world data from 3998 patients who underwent PCI were collected in four hospitals. Patient characteristics, LDL-C values at baseline and after 30 days and medication at discharge were collected.
Results:
LDL-C at baseline and follow-up was complete in 284 patients. This number is limited, because LDL-C was not routinely tested in every patient. The mean age was 64.8 ± 10.7 year, 69% was male (table 1). After one month, the LDL-C value decreased significantly from 2.96 to 1.88 ($p<0.01$). Different cholesterol lowering medication was prescribed at discharge (87.0% statins, 8.1% ezetimibe, 2.1% PCSK-9 inhibitor). Patients with a baseline LDL-C < 3 and older patients had a higher chance to reach target after 30 days. While most of the patients used at least high intensity statins, patients with baseline LDL-C ≥ 3.0 did not reach target in 78% of cases. In 81.8% of the patients only monotherapy was prescribed.
Conclusion:
In our study population the LDL-C value decreased within the first month, target LDL-C was not reached in one month in most patients. More intensive or combination therapies should be initiated in patients with LDL-C ≥ 3 and younger patients (< 65 year) as these patients have difficulty reaching the target value.

Keywords:
Secundary prevention, LDL-cholesterol, Percutaneous Coronary Intervention (PCI)

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Figure:
Table 1: Patient characteristics LDL-C treatment and predictors reaching target value

Baseline Characteristics	**ACS (n=192)**	**CCS (n=92)**	
Age	63.8 ± 11.1	67.0 ± 9.6	p=0.015
Sex			
Male	68.8%	70.7%	NS
BMI	28.3 ± 4.0	28.2 ± 4.2	NS
Smoking			
Yes	25%	20.0%	
Former	22.2%	23.3%	
No	52.8%	56.7%	NS
LDL-C	3.15 ± 1.14	2.57 ± 1.13	p<0.001
LDL-C decrease	1.14 ± 1.12	0.54 ± 1.07	p<0.001
Cholesterol lowering medication at discharge			
Statins	88.2%	84.6%	
Ezetimibe	7.3%	9.8%	
PCSK-9 Inhibitor	2.6%	1.1%	NS
Cholesterol lowering treatment type at discharge			
None	8.4%	14.3%	
Mono therapy	84.4%	75.8%	
Combination therapy	6.7%	9.9%	NS

Univariate Regression of Predictors Reaching LDL-C < 1.4		
Variable	OR	95% CI
Age <65 year	0.574	0.341-0.966
Male	1.325	0.749-2.343
BMI > 30	1.059	0.605-1.852
LDL at baseline < 3	2.028	1.200-3.425
DM	1.153	0.642-2.074
ACS	1.650	0.938-2.904
MI in past	1.451	0.812-2.594
PAD in past	0.789	0.322-1.935

BMI, body mass index; ACS, acute coronary syndrome; CCS, chronic coronary syndrome ; LDL-C, low density lipoprotein-cholesterol; DM, diabetes mellitus; MI, myocardial infarction; PAD, peripheral arterial disease.

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The Dynamic Risk of Heart Failure: a Systematic Review and Meta-regression of Observational Studies

Presenting author: A. Shakoor
Department: Cardiology

A. Shakoor (Erasmus University Medical Centre, Rotterdam); R.M.A. van der Boon (Erasmus University Medical Centre, Rotterdam); S. Abou Kamar (Erasmus University Medical Centre, Rotterdam); I. Kardys (Erasmus University Medical Centre, Rotterdam); E. Boersma (Erasmus University Medical Centre, Rotterdam); R.A. de Boer (Erasmus University Medical Centre, Rotterdam); N.M. van Mieghem (Erasmus University Medical Centre, Rotterdam); J.J. Brugts (Erasmus University Medical Centre, Rotterdam)

Purpose:
To determine all-cause mortality and HF hospitalizations associated with the distinct stages of heart failure (HF) and provide evidence for the prognostic value of worsening HF (WHF).
Methods:
A systematic review of observational studies from 2012 to 2022 that reported death and/or HF readmission in new-onset HF (NOHF), chronic (CHF), WHF or adv. HF population was carried out. Primary outcomes were 1-month all-cause mortality and 1-year all-cause mortality and/or HF-rehospitalization. To calculate mortality rates, studies were pooled using random effect meta-analysis. To compare the different stages of HF, a mixed effects meta-regression with inverse-variance weights was used. In the advanced HF group, mortality, heart transplantation and left ventricle device implantation were regarded equivalent.
Results:
Among the 14.432 studies screened, 65 were included representing 862.046 HF patients. Pooled 30-day mortality was comparable between patients admitted to the hospital (NOHF: 10.2% (95% C.I. 8.3-14.0) and WHF: 8.4% (95% C.I. 7.0-9.1). The 1-year mortality- and HF-rehospitalization risk differed and increased stepwise from CHF to adv. HF (Fig 1A and 1B). The Odds ratios (95% C.I.) were 2.98 (2.23-3.98), 4.21 (3.09-5.72) and 4.22 (2.98-5.70) in NOHF, WHF and Adv. HF respectively (CHF as reference).
Conclusion:
The results of our analysis confirm the dynamic risk across the different HF stages. Additionally, it underlines the negative prognostic value of WHF as the first progressive stage from CHF towards adv. HF. These findings underscore the utility of defining WHF as a specific stage within the HF continuum that precedes deterioration. Mitigating WHF may further improve management of this high-risk population.

Keywords:
Heart failure outcome, Dynamic risk, Worsening heart failure

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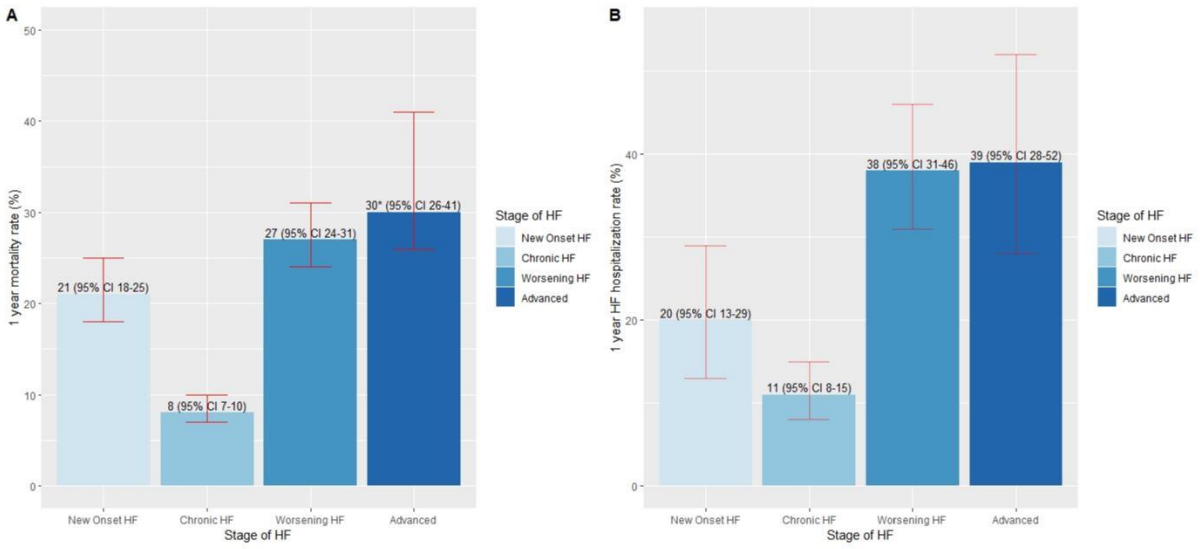
Figure:
Figure 1A and 1B: Pooled 1-year all-cause mortality and HF-hospitalization for the different HF stages. Rates are expressed as percentage (%) with 95% CI. The red error bar is the visual representation of the 95% CI. 95% CI, 95% confidence interval
* Combined endpoint (all-cause mortality, left ventricle assist device implantation and/or heart transplantation)



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Changes in Diagnostic Trajectory of Cardiac Amyloidosis over 6 Years: Role of Improving Awareness

Presenting author: A. Achten
Department: Cardiology

A. Achten (MUMC+, Maastricht); J. Weerts (MUMC+, Maastricht); S. Michielsen (MUMC+, Maastricht); V.P.M. van Empel (MUMC+, Maastricht); S. Sanders-van Wijk (MUMC+, Maastricht); H.P. Brunner-la Rocca (MUMC+, Maastricht); C. Knackstedt (MUMC+, Maastricht)

Purpose:
Introduction
The awareness of cardiac transthyretin amyloidosis (ATTR-CA) has increased over the years due to diagnostic and therapeutic developments. Nevertheless, early diagnosis of ATTR-CA remains challenging and diagnosis is often delayed.
Objectives
To evaluate the diagnostic trajectory of ATTR-CA in a tertiary medical centre in the Netherlands, with emphasis on improving time to diagnosis.
Methods:
This is a prospective observational cohort study of patients diagnosed with ATTR-CA in a tertiary medical centre in the Netherlands, between 2016 and 2022.
Results:
This study included 52 ATTR patients who were screened for cardiac involvement, of whom 42 (80.8%) were diagnosed with ATTR-CA wild-type (ATTRwt-CA) and 10 (19.2%) with ATTR-CA hereditary (ATTRh-CA). Analysis per two year periods revealed an increase in ATTR-CA diagnoses over time (Figure 1), driven by ATTRwt-CA increase. Over time, the diagnostic trajectory entailed more non-invasive radionuclide bone scintigraphy, from 50.0%, 68.0% to 97.0% respectively (p=0.002), and less invasive diagnostic methods (e.g. cardiac biopsy, 75%, 33% and 15% respectively, p=0.025). The prevalence of Perugini grade 1 on bone scintigraphy and therefore the necessity to perform a cardiac biopsy remained unchanged (0.0%, 10.0% and 3.3% respectively, p=0.470). Nevertheless, the interval between the onset of heart failure complaints and ATTR-CA diagnosis has not changed significantly (4.2, 1.8 and 2.7 years respectively, p=0.640). While overall, but not significantly the diagnostic trajectory became shorter (35.1, 7.0 and 7.9 respectively, p=0.552)(figure 1).
Conclusion:
The awareness of ATTR-CA led to a substantial increase in diagnoses, predominantly ATTRwt-CA. Less invasive diagnostic trajectories were employed over time. Overall, the symptom-to-diagnosis duration has remained similar driven by time to referral. Therefore, more effort seems still needed to further increase awareness in the medical field. New strategies, such as clinical prediction scores may help to identify patients with increased risk of ATTR-CA in earlier stages.

Keywords:
Cardiac amyloidosis, Diagnostic trajectory,

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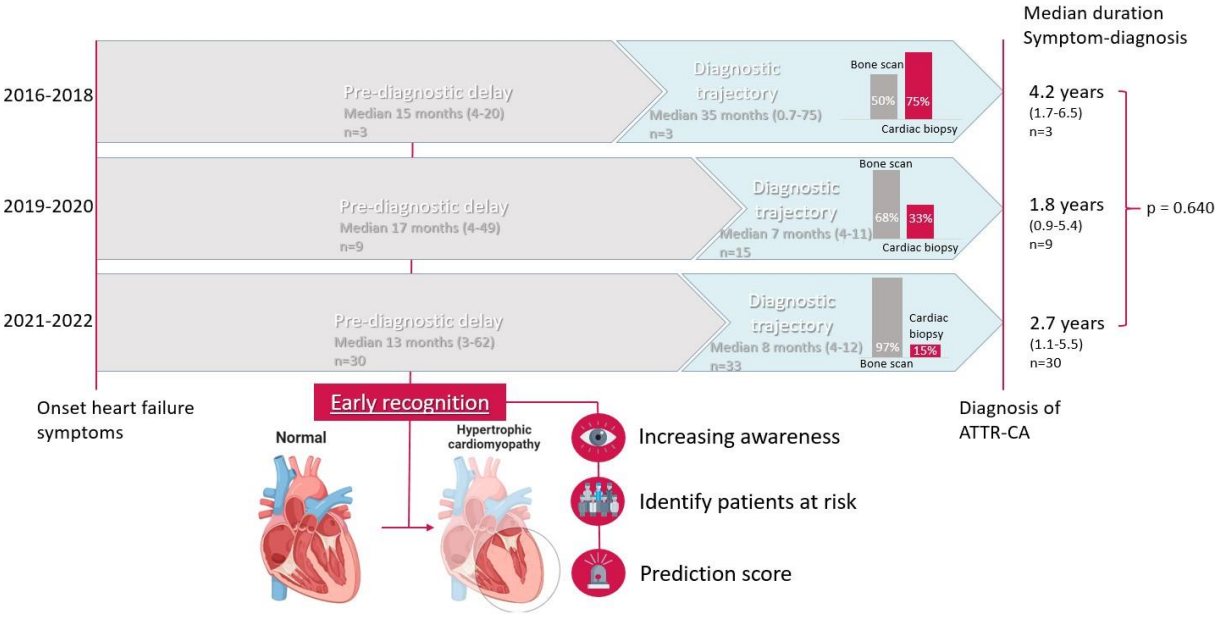
Figure:
Timeline per two year periods of onset of heart failure symptoms to ATTR-CA diagnosis



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Referral Patterns for Advanced Heart Failure Therapies

Presenting author: R. van der Hoorn – Huisman
Department: cardiologie

R. van der Hoorn – Huisman (Erasmus MC, Rotterdam/Hagaziekenhuis, Den Haag); A. Shakoor (Erasmus MC, Rotterdam); M. Darvish (Erasmus MC, Rotterdam); A. Mahamed (Erasmus MC, Rotterdam); A. Mkrtchjan (Erasmus MC, Rotterdam); O.C. Manintveld (Erasmus MC, Rotterdam); C.J.W. Borleffs (Hagaziekenhuis, Den Haag); J.J. Brugts (Erasmus MC, Rotterdam); R.M.A. van der Boon (Erasmus MC, Rotterdam)

Purpose:
Therapies for advanced heart failure (AHF) have shown to increase quality-adjusted life years. However, successful utilization and implementation is dependent on appropriate referral to an AHF center. The purpose of this study is to describe current referral patterns and evaluation outcomes.
Methods:
We performed a retrospective observational analysis of patients referred for AHF therapies to the Erasmus Medical Center in 2021. Patients' demographics, characteristics, referral circumstances and evaluation outcomes were collected.
Results:
A total of 141 patients were referred of which 28% were female and a mean age of 55±16 years (Table. 1). Referrals were evenly distributed from within the Greater-Rijnmond area and beyond. The majority of patients were in NYHA class III/IV and met the ESC criteria for AHF. At referral 44% of chronic HF patients were on triple therapy and most patients (71.6%) could be further medically optimized. Fourty-eight patients were discussed for AHF therapies from whom 18 patients were accepted for LVAD, listing for transplantation or both. Main reason for rejection was comorbidity ('too sick', 36.1%) followed by 'too well' (22.2%) and 'right ventricular failure' (11.1%).
Conclusion:
In this retrospective study the majority of AHF referrals were appropriate. Nevertheless, in a significant proportion of patients AHF therapies could be deferred with medical optimization. From the population discussed most were turned down for AHF therapies primarily due to comorbidities and possible late referral. These outcomes suggest a significant need for regional collaboration and education to improve uptake of medical treatment and appropriate timing of referral to AHF centers for optimal outcomes.

Keywords:
advanced heart failure, referral patterns, collaboration

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Figure:
Table 1. Baseline characteristics of the population referred to the Erasmus MC for advanced HF therapies.
* Excluding new onset heart failure patients

Patients' and Referral Characteristics		N / total
Age, years (mean ±SD)		55.27 ±15.8
Sex	Male	102/141 (72.3)
	Female	39/141 (27.7)
Race (%)	Caucasian	111/141 (78.7)
	Black	7/141 (5.0)
	Asian	3/141 (2.1)
	Hispanic	2/141 (1.4)
	Arab	14/141 (9.9)
	Hindustan's	4/141 (2.8)
In-patient referral		20/141 (14.2)
Referral from within the Greater Rijnmond area		76 / 141 (54.0)
New onset Heart Failure (%)		33/141 (23.4)
Time from HF-diagnosis to referral, months (median) [IQR]*		44 [13-102.75]
HF-Hospitalization in the last 6 months (%)		66/141 (46.8)
Referral conform ESC criteria for advanced care (%)		90/141 (63.8)
History of (%)	Myocardial infarction	46/141 (32.6)
	Atrial fibrillation	56/141 (39.7)
	Hypertension	53/141 (37.6)
	Diabetes mellitus	36/141 (25.5)
	Peripheral artery disease	8/141 (5.7)
	Ventricular ectopy or ICD shock in the last year	23/141 (16.3)
	Chronic kidney disease (GFR < 60 ml/min)	61/139 (43.9)
Etiology (%)	Ischemic	44/141 (31.2)
	Non-ischemic	97/141 (68.8)
NYHA Class (%)	III	66/141 (46.8)
	IV	16/141 (11.3)
INTERMACS (%)	2	2/141 (1.4)
	3	3/141 (2.1)
	4	6/141 (4.3)
	5	26/141 (18.4)
	6	30/141 (21.3)
	7	13/141 (9.2)
Left ventricular function (%)	Good	17/138 (12.3)
	Reasonable	9/138 (6.5)
	Moderate	27/138 (19.6)
	Severely reduced	85/138 (61.6)
Medical therapy* (%)	Beta-blocker	76/108 (70.4)
	RAAS-Inhibitor	77/108 (71.3)
	MRA	73/108 (67.6)
	SGLT2- inhibitor	18/108 (16.7)
Triple therapy* (RAAS-inhibitor, B-blocker, MRA, %)		47/108 (43.5)
Device therapy (%)	CRT	17/141 (12.1)
	ICD	52/141 (36.9)