2023.06.23. (Fri)
15:15~16:45 15 min (ENG)

Cross Specialty Session 2. EP - Neurology

KHRS 2023
June 23(Fri.) - 24(Sat.), 2023
Grand Walkerhill Seoul, Korea
The 15th Annual Scientific Session of the Korean Heart Rhythm Society

Understanding Atrial Cardiopathy

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William Harvey

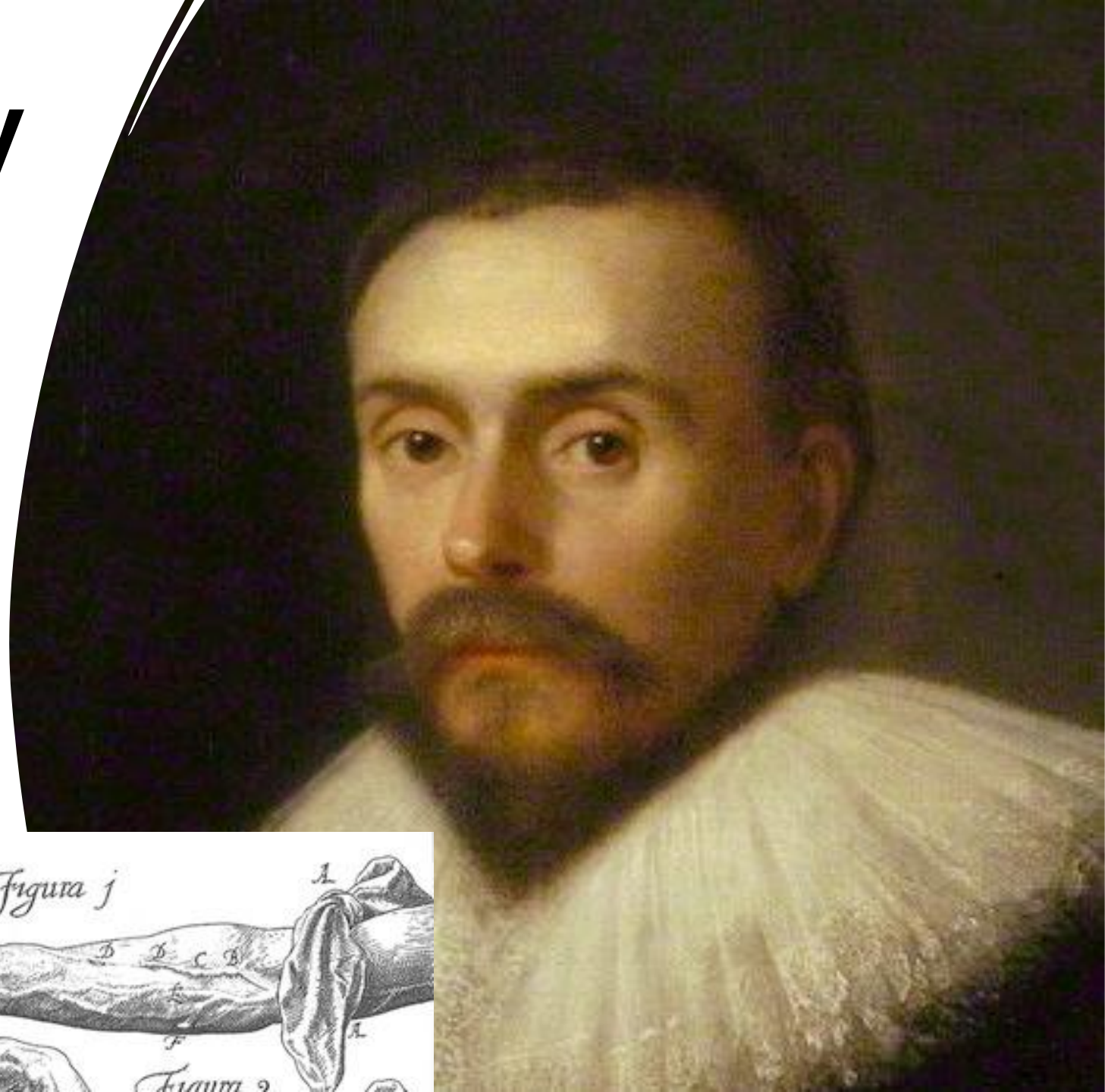
1578 ~ 1657, UK

Invisible?

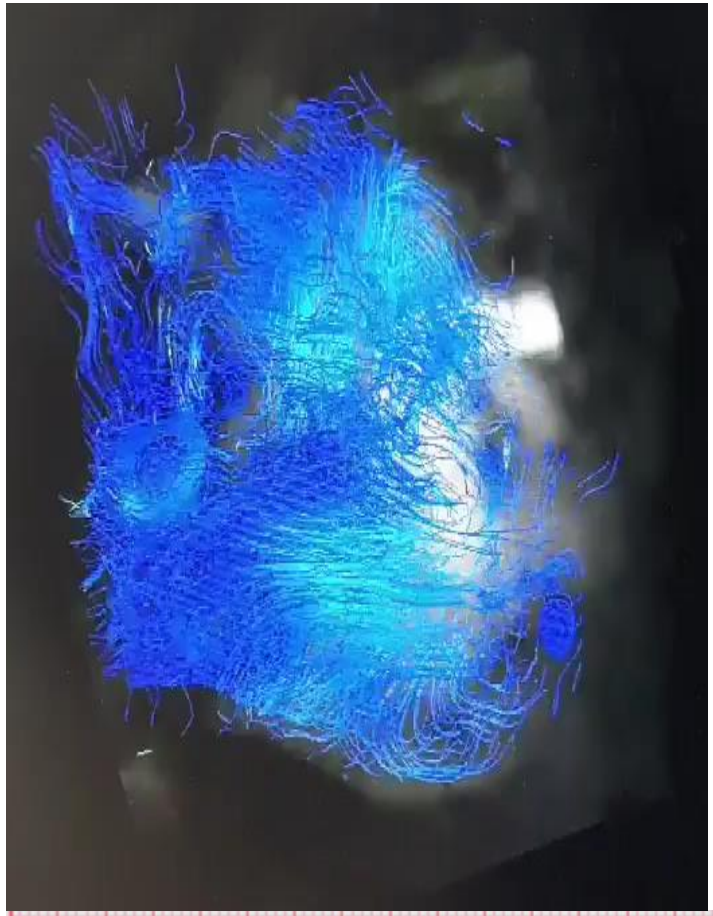
Exist!

EXERCITATIO
ANATOMICA DE
MOTV CORDIS ET SAN-
GVINIS IN ANIMALI-
BVS,
GVILIELMI HARVEI ANGLI,
Medici Regii, & Professoris Anatomiæ in Col-
legio Medicorum Londinensi.
FRANCOFVRTI,
Sumptibus GVILIELMI FITZERI.
ANNO M. DC. XXVIII.

TITLE-PAGE OF *DE MOTU CORDIS*, 1628

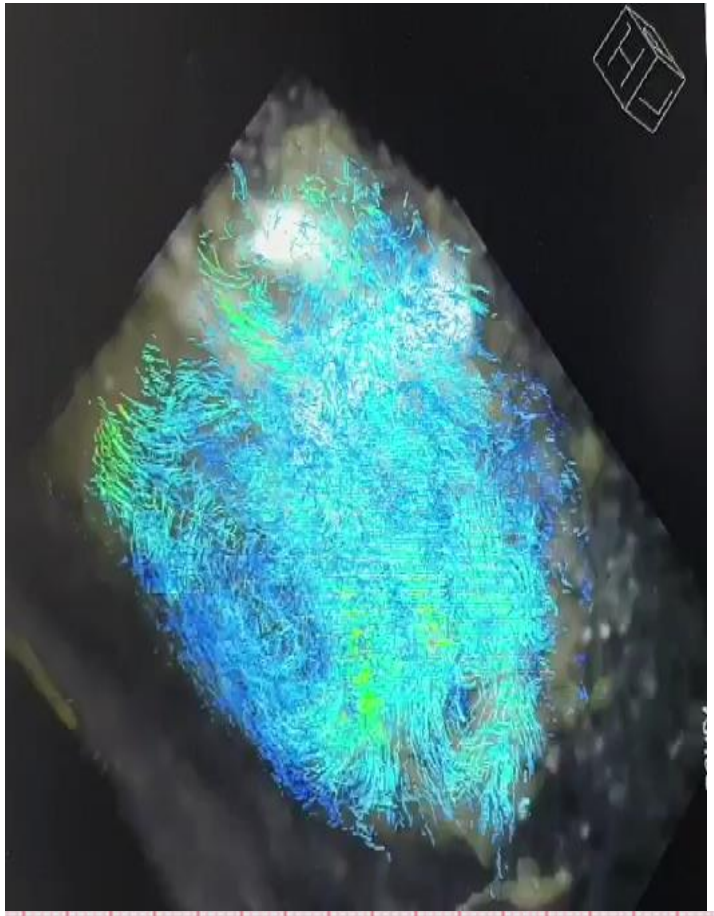


Normal Sinus Rhythm vs. Atrial Fibrillation



Regular
Synchronized

Mechanical Activity assessed by
4D MRI



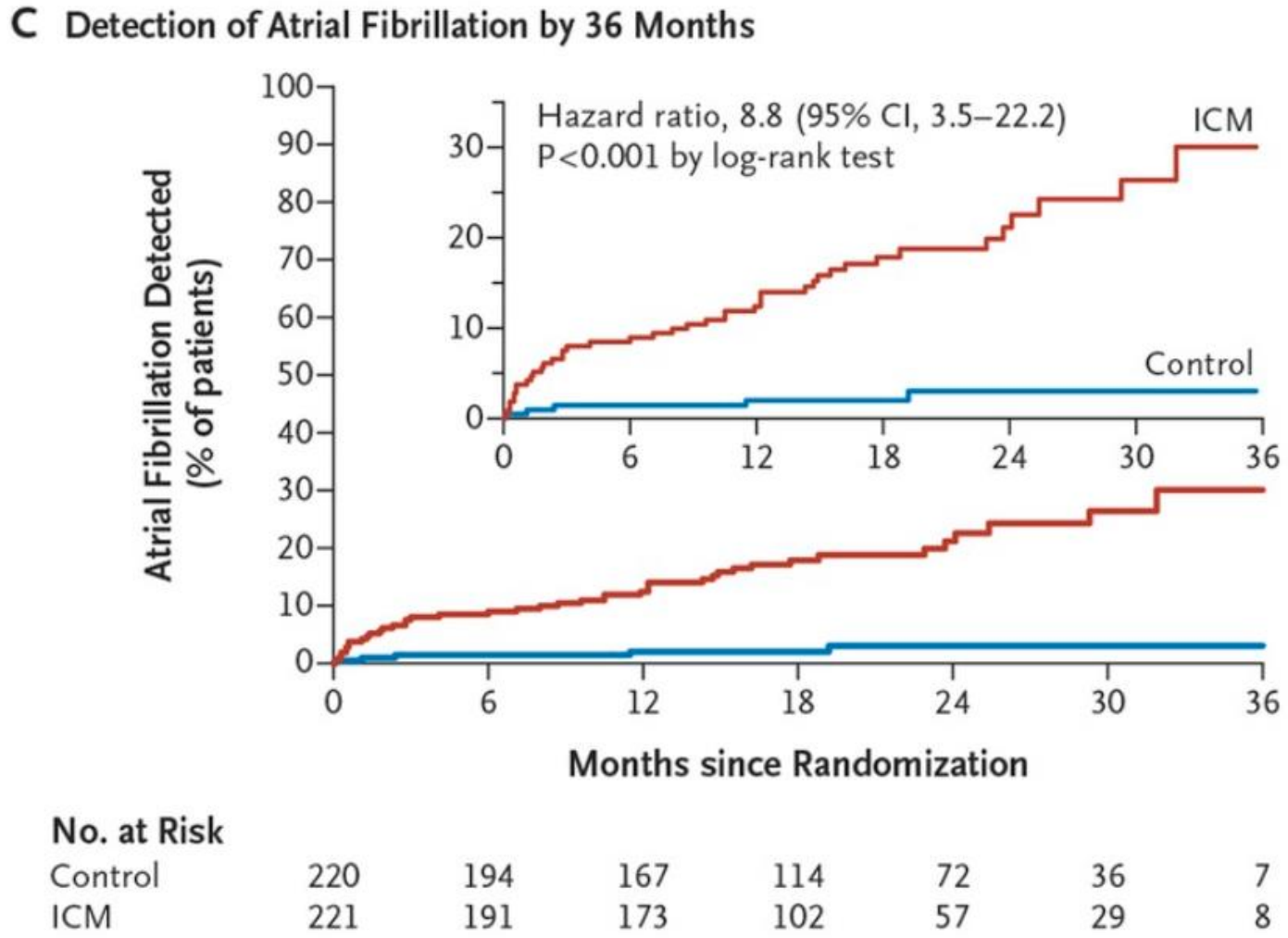
Irregular
Dyssynchronized

Blood Stasis
➔ Thrombi
➔ Stroke

Electrical Activity assessed by
EKG

In CRYSRAL-AF Trial…

- N = 447 cryptogenic stroke patients
- 1:1 randomization to ICM vs. standard care



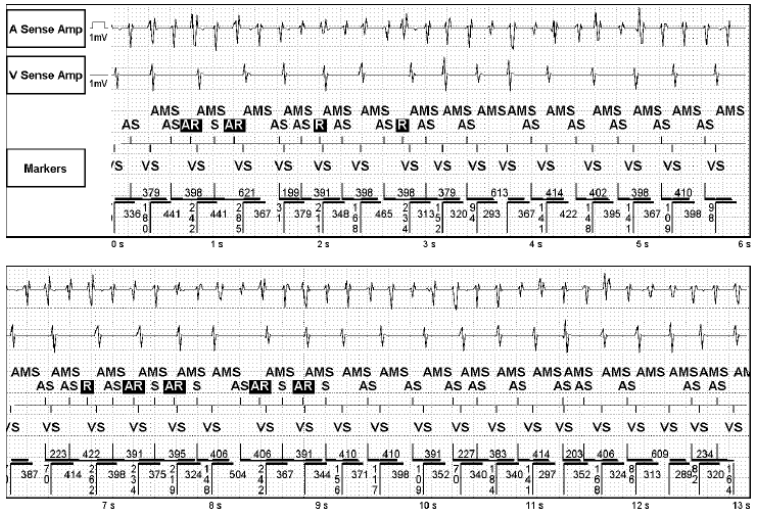
ILR markedly increased AF detection by **8.8 times**

Remaining 2/3 of ILR group were unrevealing despite of **3 years of continuous ECG monitoring**

Sanna T et al. NEJM 2014; 370:2478-2486

Within Pacemaker Clinic,

- F/78, Sick sinus syndrome
- Pacemaker implantation in 2020
- **3 Recurrent stroke events** in 2013, 2016, 2018
- Favors thromboembolic stroke
- Failed to diagnose AF before PM implantation
- During 3 years follow up, AF was detected in PM



True AF events in EGM

Episodes

Date / Time	Type	Peak A / V Rate (min-1)	Duration (D:H:M:S)	Alerts
Mar 5, 2023 11:49 am	AMS Entry	187 / 63	0:00:00:04	
Mar 5, 2023 11:49 am	AMS Entry	226 / 124	0:00:00:08	
Mar 4, 2023 1:11 pm	High Ventricular Rate		0:00:00:37	
Mar 4, 2023 1:01 pm	AMS Entry	640 / 194	0:00:45:42	
Mar 4, 2023 11:49 am	AMS Entry	290 / 135	0:00:00:12	

Atrial Cardiopathy

- Recent advances in pa
stroke even in patients
cardiopathy", which i
objective of this narrat
cryptogenic stroke. We
identified studies, inclu
relationship between a
atrial cardiopathy. Abn
stroke before developi
Although there are sev
force in lead V1 (>5,0
atrial enlargement ar
Because **the optimal**
remain uncertain, atr
cardiopathy appears to
stroke. Validation of th
therapeutic target for direct oral anticoagulants are currently being covered in the ARCADIA trial.

Definition of atrial cardiomyopathy

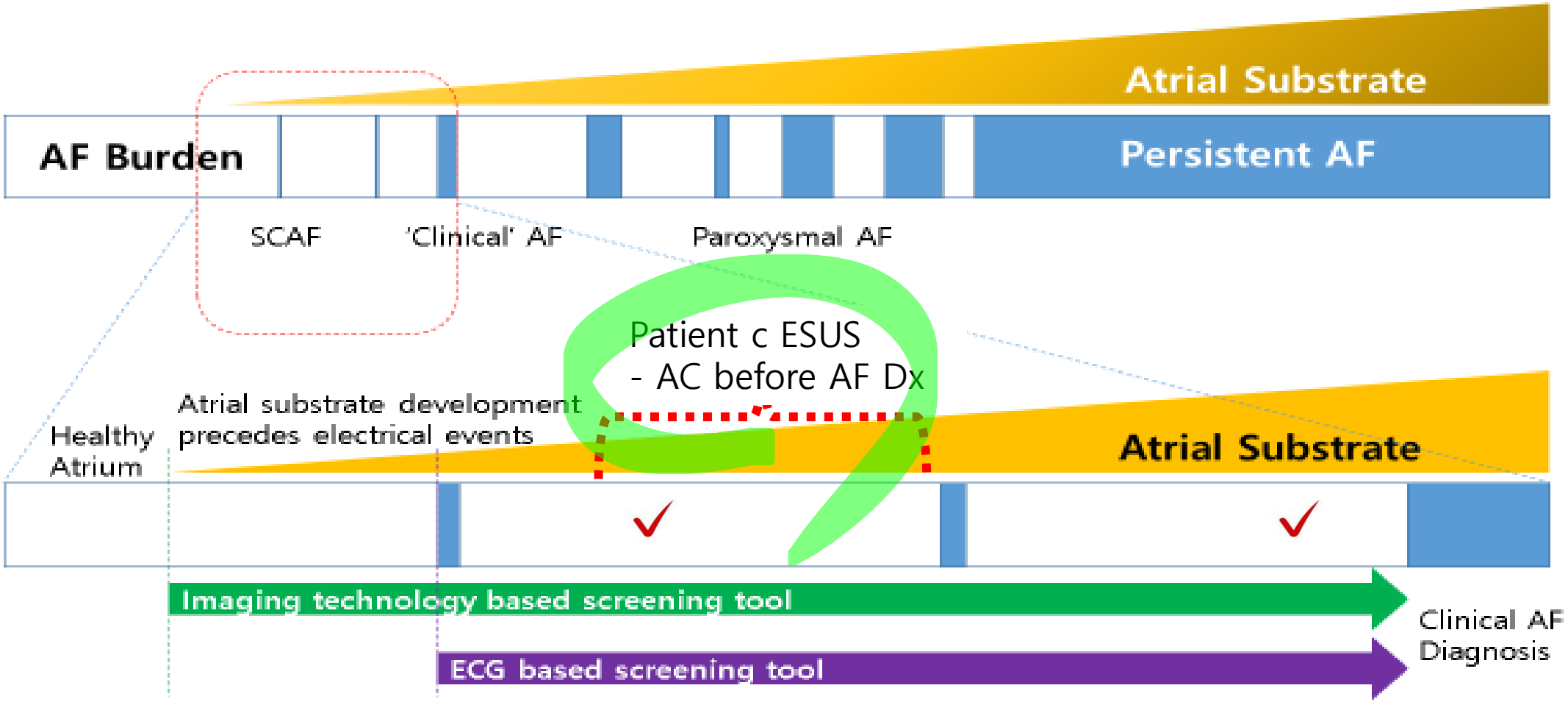
The working group proposes the following working definition of atrial cardiomyopathy: 'Any complex of structural, architectural, contractile or electrophysiological changes affecting the atria with the potential to produce clinically-relevant manifestations' (*Table 1*).

Many diseases (like hypertension, heart failure, diabetes, and myocarditis) or conditions (like ageing and endocrine abnormalities) are known to induce or contribute to an atrial cardiomyopathy.

Europace 2016;18:1455-1490.

Kato Y et al. Frontiers in Neurol. 2022; 13. https://doi.org/10.3389/fneur.2022.839398

AF is Progressive



Shin SY, Lip GYH. *Can J Cardiol.* 2018;34:1407-1411.

Subclinical AF (SCAF) & Stroke

Eur J Echocardiogr. 2011 Feb;12(2):140-7. doi: 10.1093/ejechocard/jeq164. Epub 2010 Nov 26.

Impaired transport function of the left atrium and left atrial appendage in cryptogenic stroke patients with atrial septal aneurysm and without patent foramen ovale

Jin Oh Na [1], Seung Yong Shin, Hong Euy Lim, Cheol Ung Choi, Seong Hwan Kim, Jin Won Kim, Eung Ju Kim, Eun Mi Lee, Seung-Woon Rha, Chang Gyu Park, Hong Seog Seo, Dong Joo Oh, Young-Hoon Kim

Impaired LA function may suggest SCAF in cryptogenic stroke patients

Abstract

Aims: Although atrial septal aneurysm (ASA) is frequently combined with patent foramen ovale and associated with cryptogenic stroke (CS), a pathophysiologic correlation between CS and ASA alone has not been fully elucidated. The aims of this study were to assess transport functions of the left atrium (LA) and left atrial appendage (LAA), and to evaluate their relationship in CS subjects with ASA alone.

Methods and results: This study consisted of 38 CS subjects with ASA alone and 38 matched controls. Transthoracic echocardiography including tissue Doppler imaging was performed in all subjects and transesophageal echocardiography was conducted in CS subjects to assess LAA emptying velocity (LAAev). We also measured soluble P- and E-selectin, interleukin-6 (IL-6), and high-sensitivity C-reactive protein (hs-CRP) as indices of prothrombogenic and proinflammatory activity. Although there were no differences in left ventricular functions and baseline characteristics between the two groups, CS subjects had significantly larger LA volume and lower LA active pump function compared with controls. LAAev was significantly correlated with LA active function. CS subjects had significantly higher E-selectin ($P = 0.046$), IL-6 ($P = 0.040$), and hs-CRP ($P = 0.001$) compared with controls.

Conclusions: Compared with controls, LA active pump function was significantly depressed and closely correlated with LAAev in CS subjects with ASA alone. Moreover, plasma levels of E-selectin, IL-6, and hs-CRP were significantly higher in CS subjects with ASA alone. These findings suggest that impaired LA and LAA functions are a crucial pathophysiologic mechanism for ischaemic stroke in subjects with ASA alone.

Functional Ranking

LA function w/o PAF

Normal

Abnormal

LA function w PAF during SR ✓

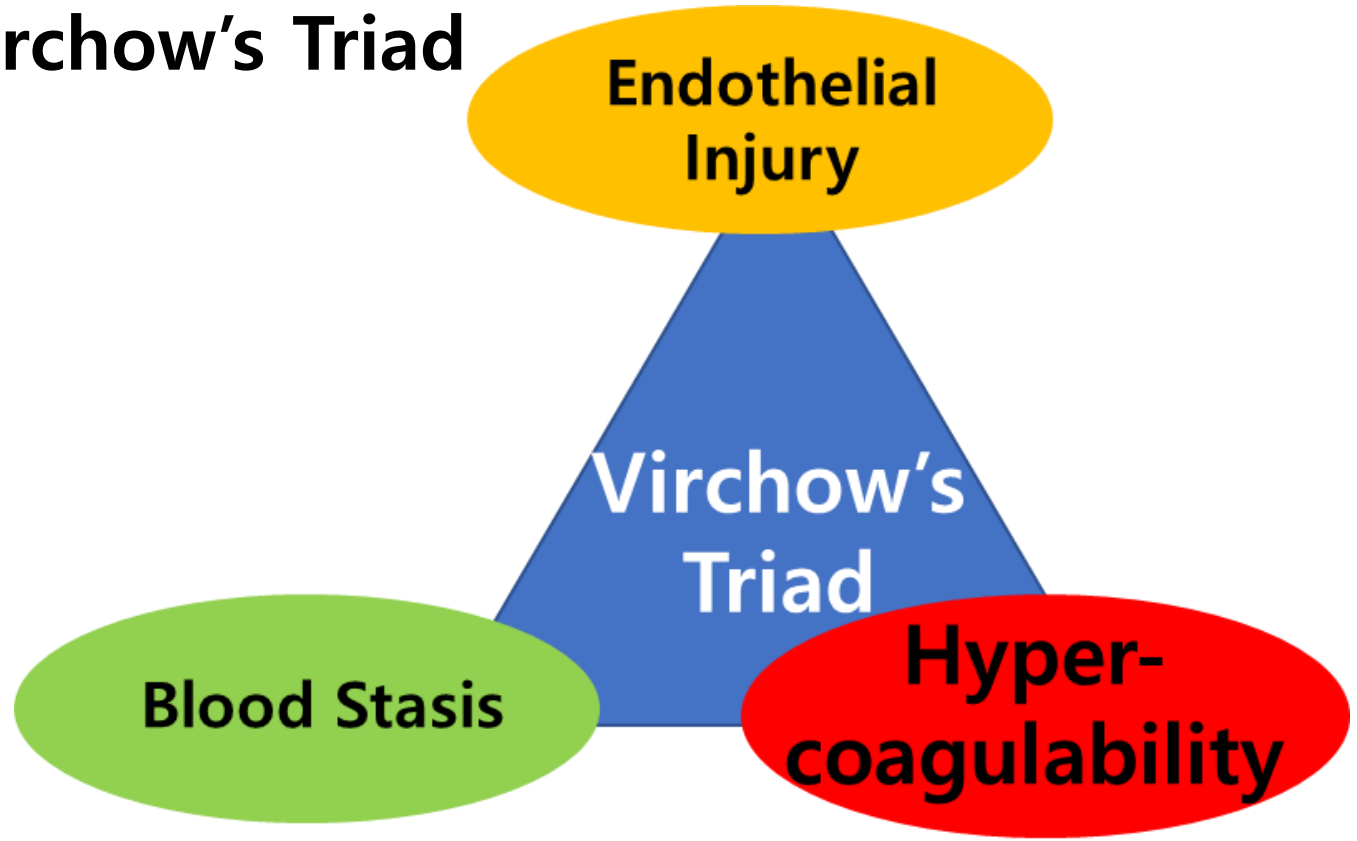
Added value by LA **Functional** assessment

LA function w PAF during AF

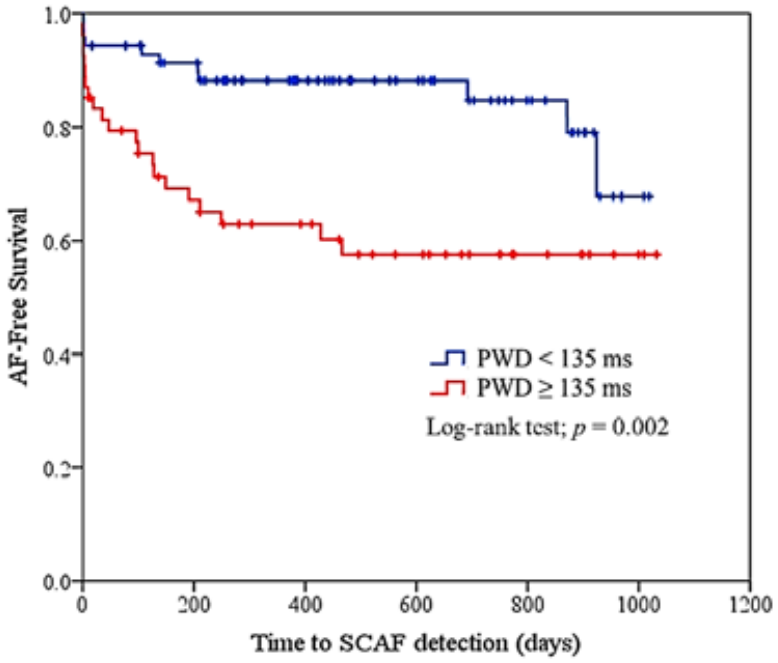
LA function w Persistent AF

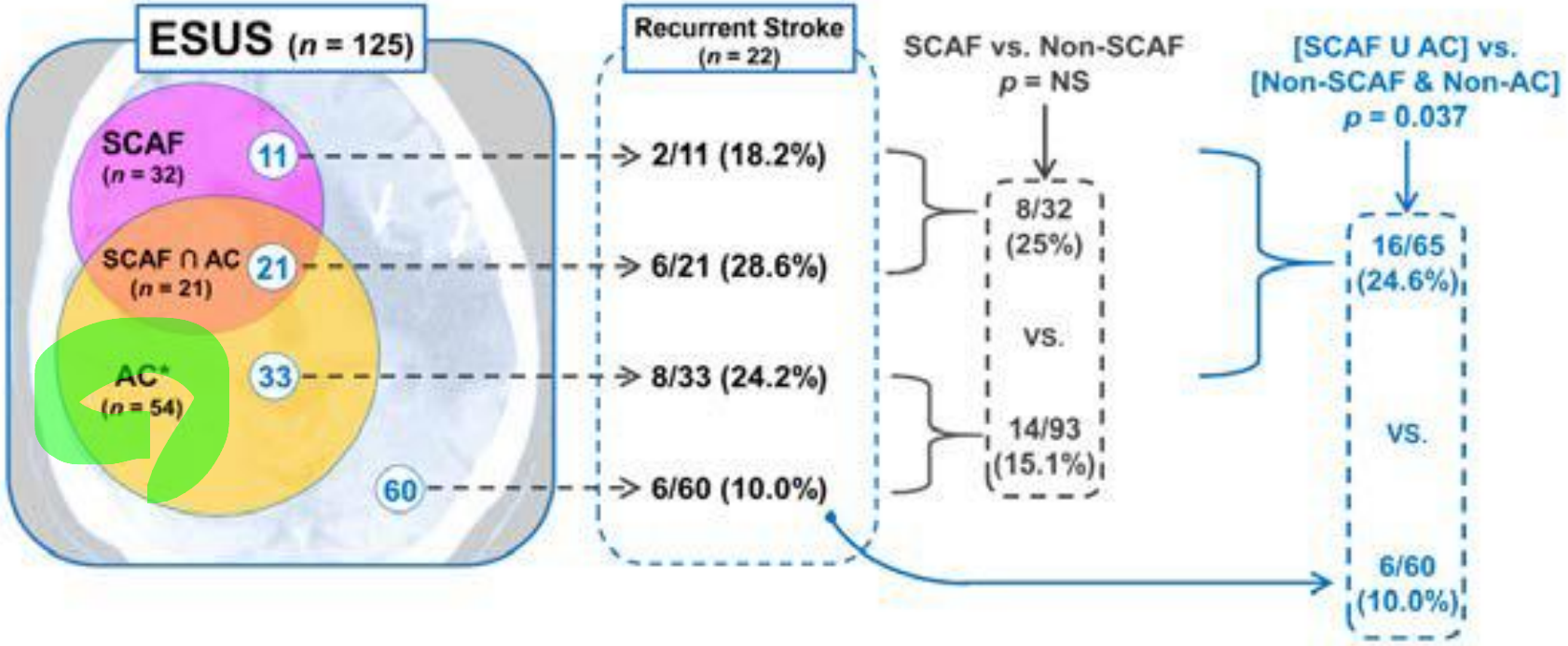
Rudolf Ludwig Karl Virchow

- 1821 ~ 1902, Germany
- **Virchow's Triad**



Risk Stratification by LA Electrical Remodeling (P wave duration by Signal averaged ECG)



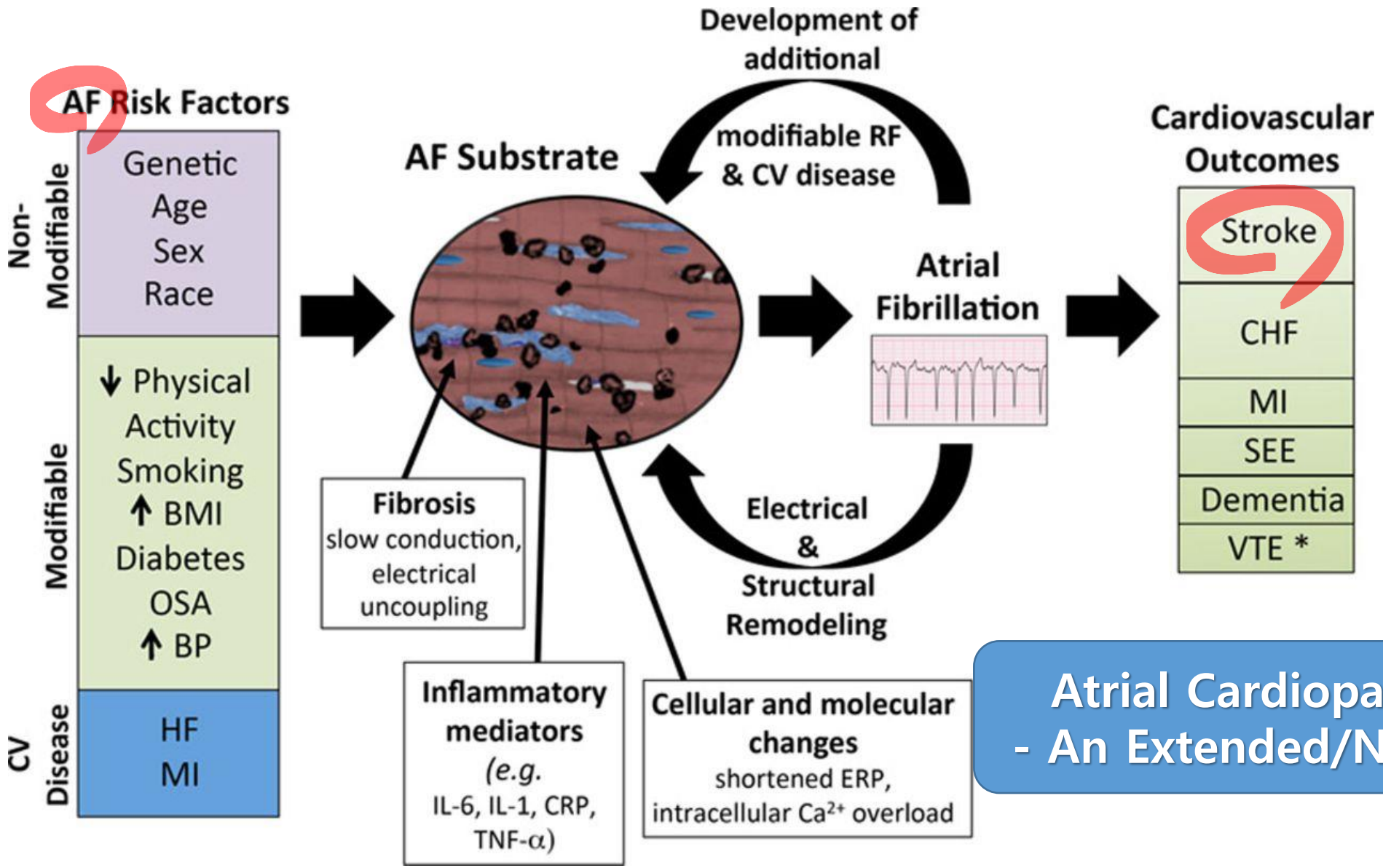


AF Detection modality
- 24 hr Holter & 12 lead ECG

Jung M,... Park KY, and Shin SY et al. J Clin Med 2020;9:1134.

Dynamic Target vs. Static Target

Shared Risk Factors & Pathogenesis



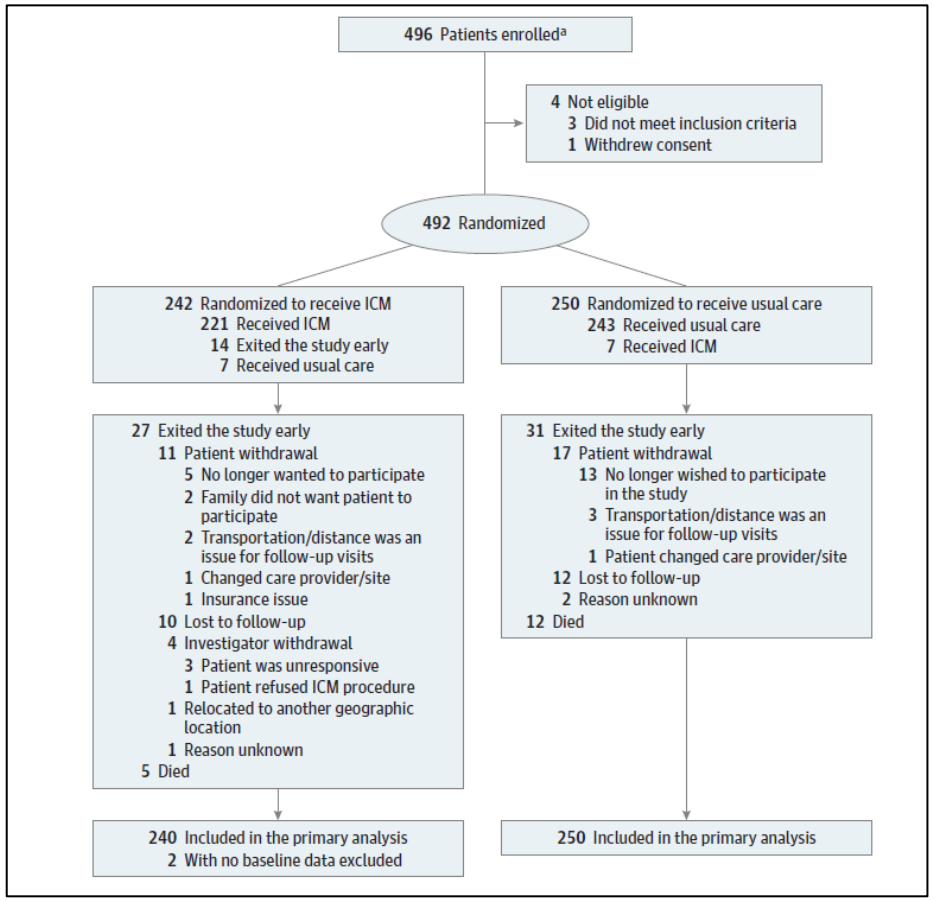
Large vessel dz
Small vessel dz
Thrombotic…

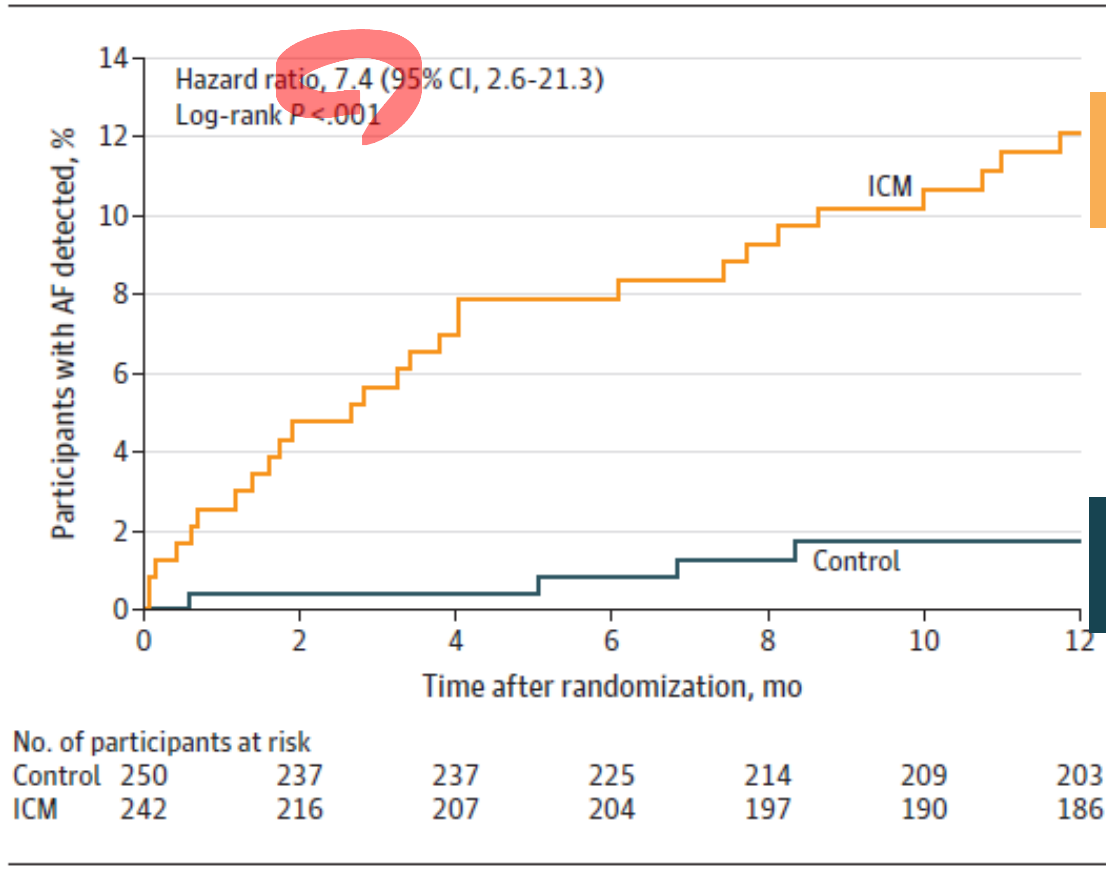
Atrial Cardiopathy (AC)
- An Extended/New Target

Recently…

STROKE-AF RCT

Tested value of **Prolonged & Continuous ECG monitoring** in Large/Small vessel diseases



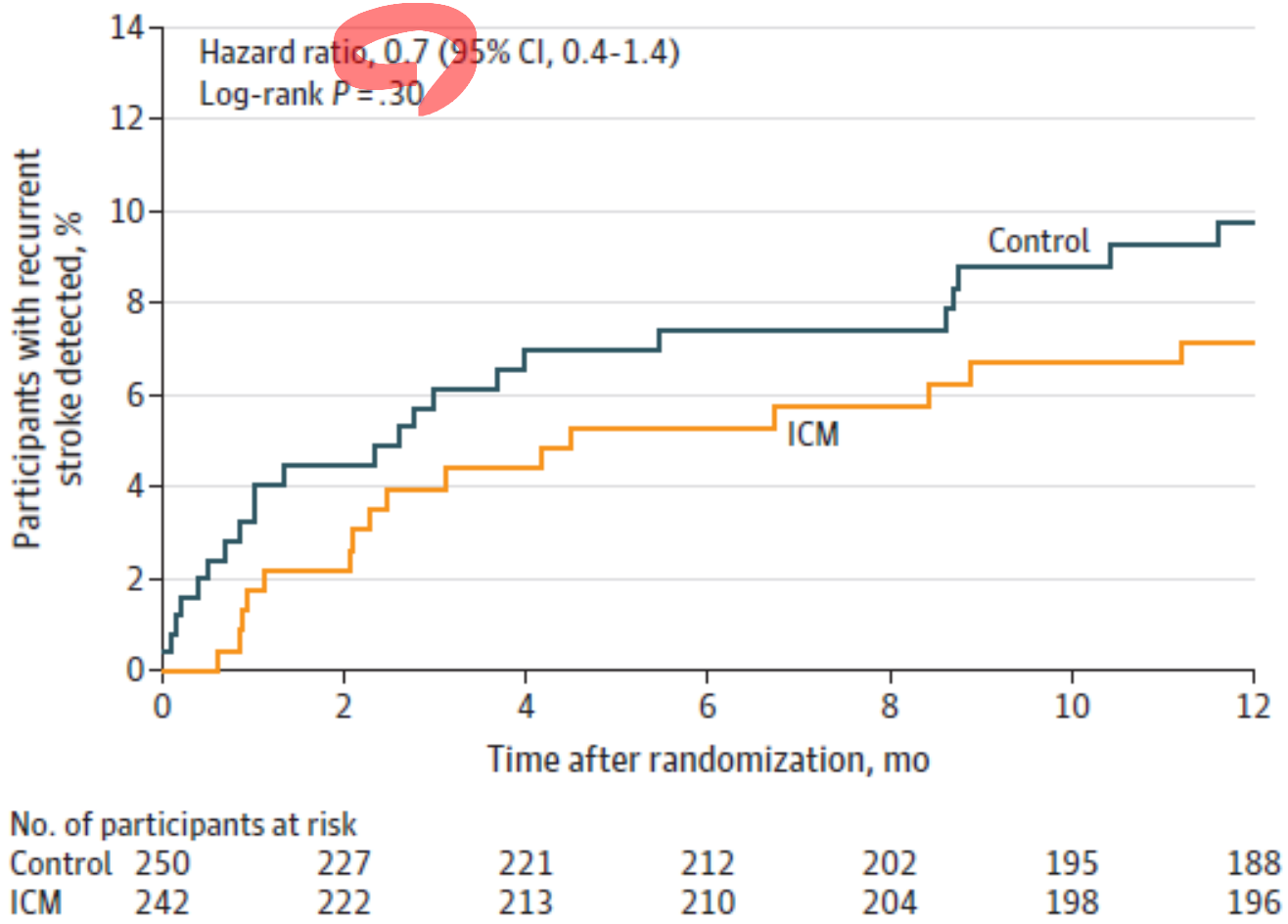


AF detection@12M
12.1 %

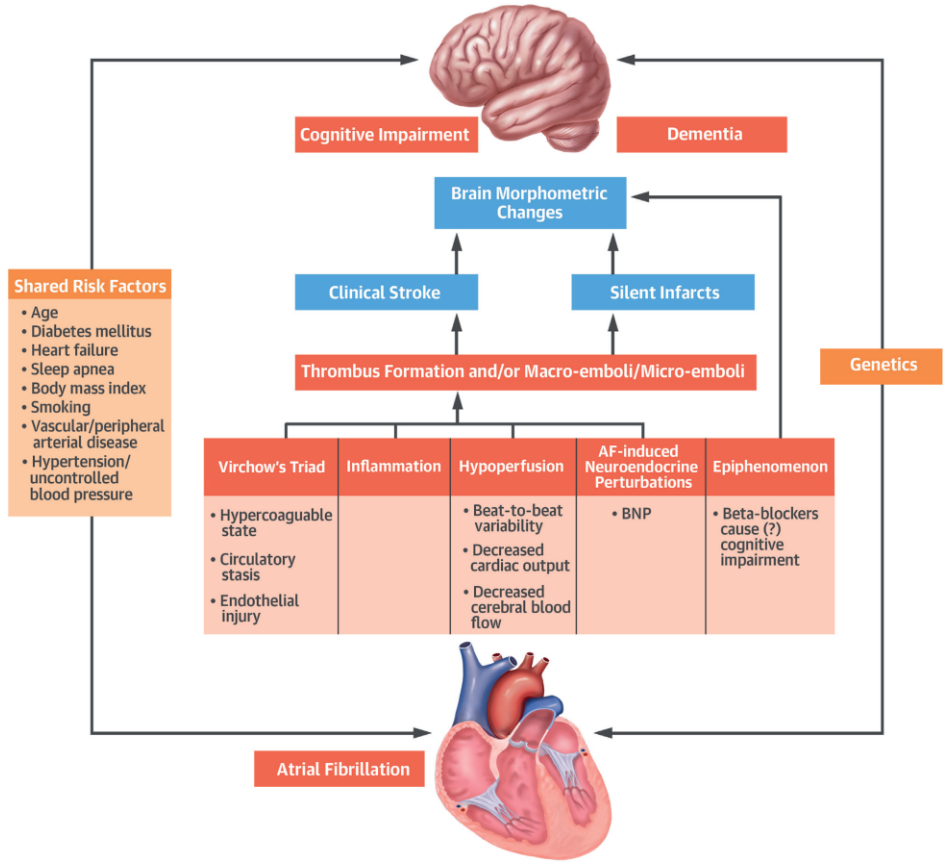
AF detection@12M
1.8 %

Bernstein RA et al. JAMA 2021; 325(21):2169-2177

Stroke Recurrence Reduced…



Bernstein RA et al. JAMA 2021; 325(21):2169-2177



Diener HC et al. J Am Coll Cardiol. 2019;73(5):612–9.

Take Home Messages

- It is time to focus our effort to **Atrial Cardiopathy (AC).**
- AC is **not a new** disease entity.
- Features suggestive of AC can be found within our current practice.
- Organization and verification of features toward clinical benefit is necessary

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