HF treatment can reduce the risk of stroke

PRO

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Clinical risk factors for embolic stroke

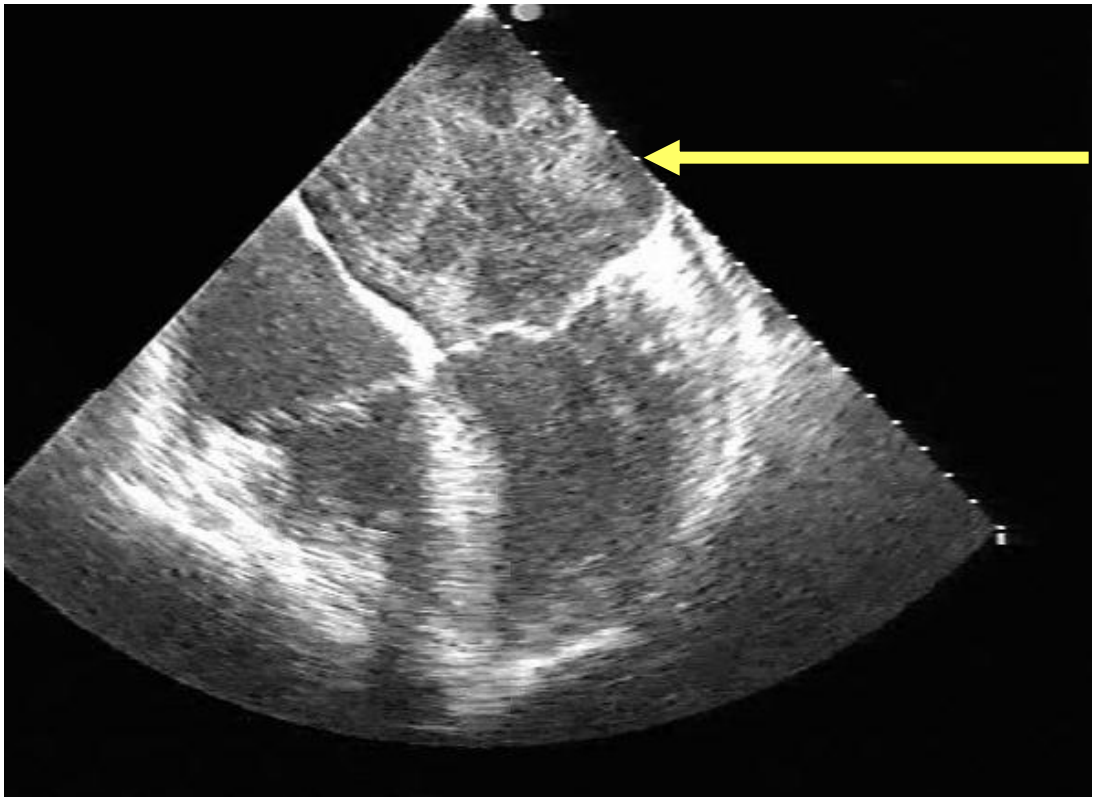
CHA_2DS_2 VASc scores - only in the context of AF related risk

Risk factor	Score
Cardiac failure	1
Hypertension	1
Age >75 years	2
Diabetes mellitus	1
Stroke or TIA	2
Vascular disease	1
Age 65-74	1
Sex category (female)	1

Score:
- 0 → no anticoagulation
- 1 → oral anticoagulation should be considered (IIaB)
- ≥2 → oral anticoagulation (IA)

CHF: High risk of cardiac thromboembolism even in maintained sinus rhythm

CHF = Increase ventricle size + Reduced contractility



Spontaneous echocardio-graphic contrast

- **low blood flow**
- **Hypercoagulability**
- **Endothelial injury**

= Pro-thrombotic state

Rudolf Virchow, Berlin, Charite, 1845

HF and stroke – an interaction with worse outcome

In patients with HF...	(vs patients without HF)
(A) … stroke is more likely	Higher stroke incidence 2 - 4 fold higher risk
(B) … stroke is more severe	Higher mortality, Worse functional outcome
(C) … stroke complicates HF	HF progression HF mortality

Stroke Prevalence in Chronic HF: ca 10%

RCT	Study population	Rhythm	History of Stroke/TIA at baseline
SOLVD-Treatment	2569	Sinus + AF (10%)	8%
CHARM-Added	2548	Sinus + AF (26%)	9%
SHIFT	6505	Sinus	8%
EMPHASIS-HF	2737	Sinus + AF (31%)	10%
PARADIGM-HF	8442	Sinus + AF (37%)	9%
TIME-CHF (2009)	499	Sinus + AF (32%)	Age: 60-74 years: 9.5% Age: >75 years: 19.4%

Registries	Study population	Rhythm	History of Stroke/TIA in ambulatory HF patients
ESC-HFLT Registry (‘13)	5039	Sinus +AF	9.4%
ESC HF Pilot Survey (‘13)	1892	Sinus+AF	10.5%

Modifying factors of stroke risk in heart failure

- Severity of HF
- Duration of HF
- Age

	NYHA Class	Ejection Fraction	Stroke Rate / Year
SAVE	1	31%	1.5%
SOLVD	1.7	27%	1.3%
Katz *et al.*	2.5	27%	1.7%
V-Heft I	2-3	30%	2.0%
PROMISE	3.4	21%	3.5%

Pullicino *et al.* Neurology 2000

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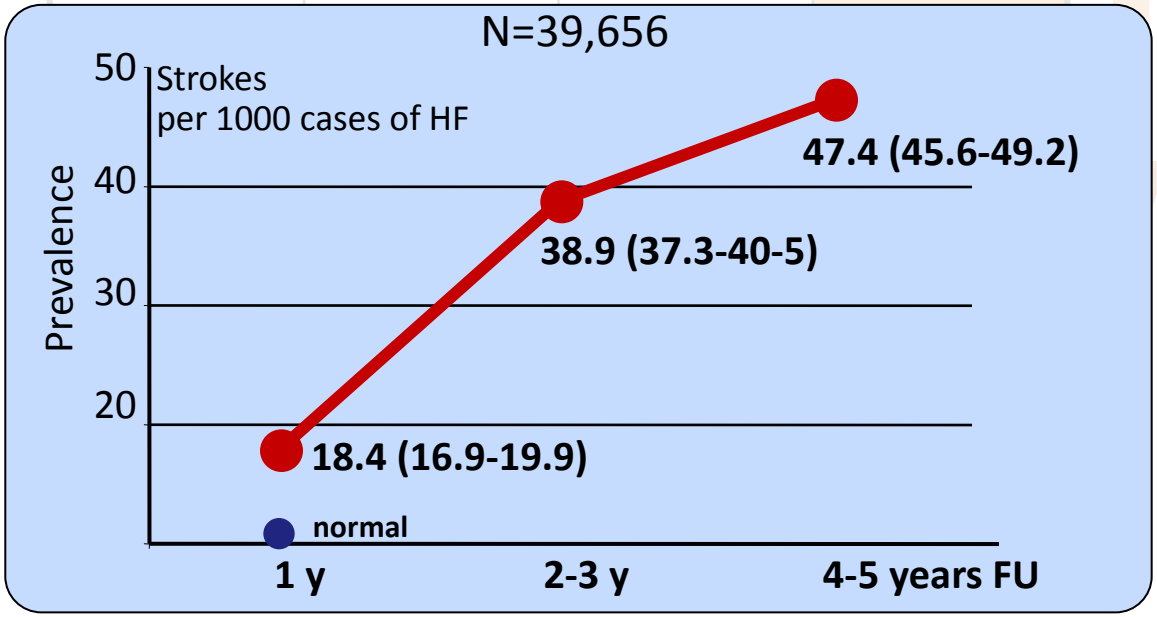

BJ Witt et al J Cardiac Fail 2008

Pullicino *et al.* Neurology 2000

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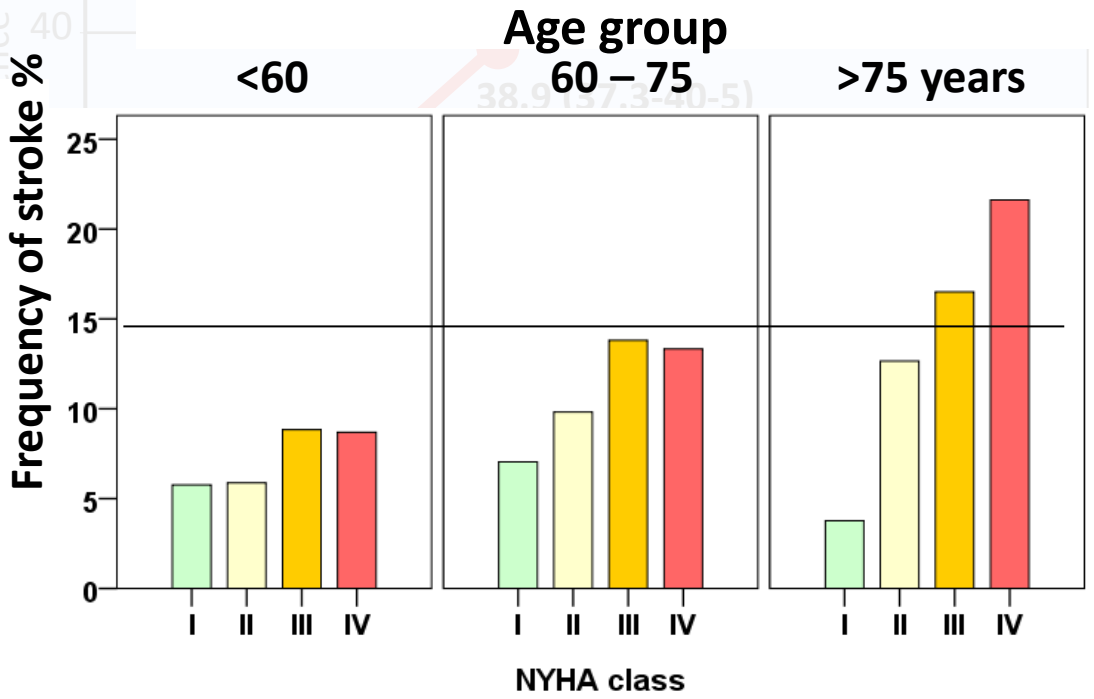


Doehner, Düngen *et al.;* Cerebrovasc Dis 2011

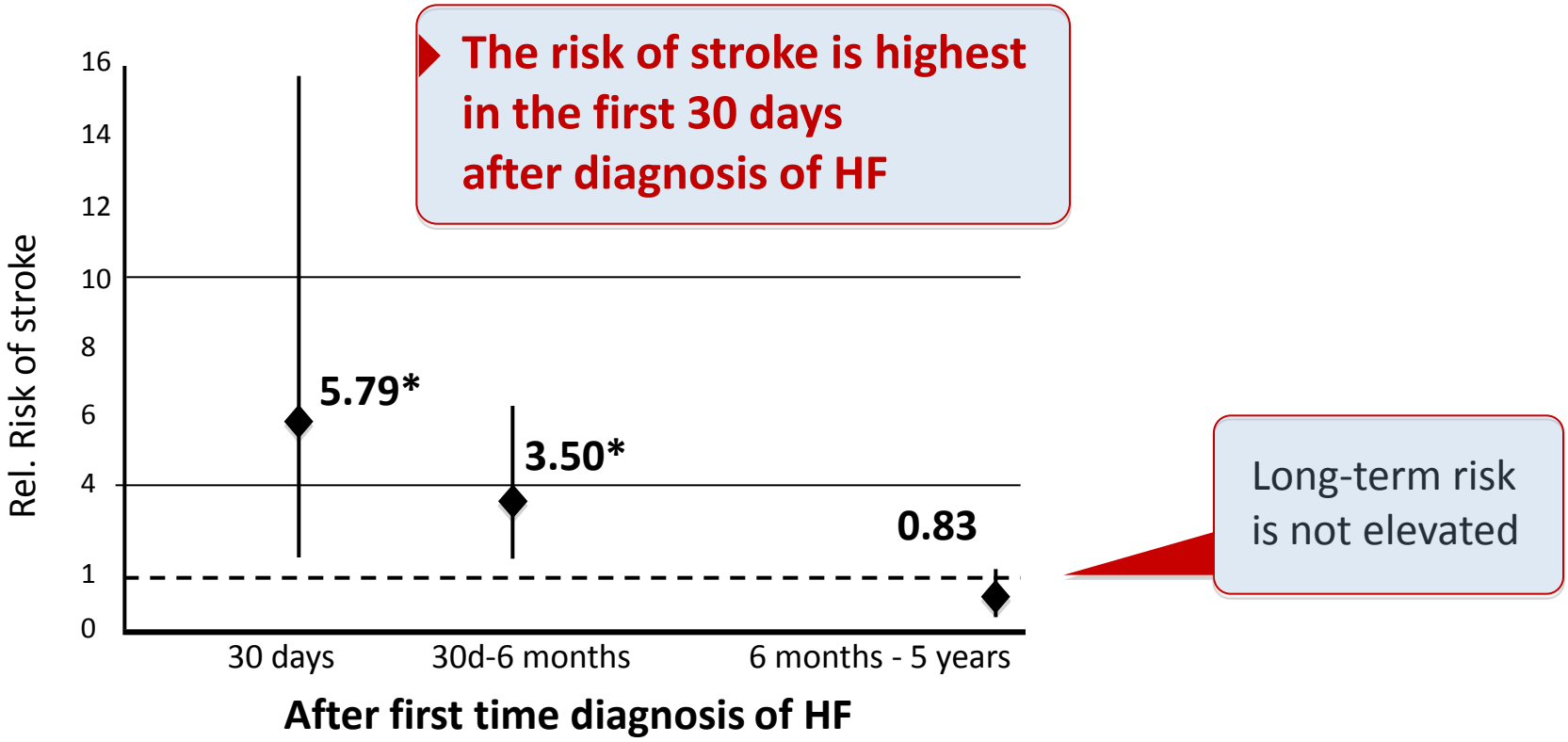
BJ Witt et al J Cardiac Fail 2008

Pullicino *et al.* Neurology 2000

HF and time dependent risk of stroke

The Rotterdam study:

7,546 patients with stroke
baseline 1990-93
mean follow up 9,7 years
1,014 new onset of HF
827 stroke events



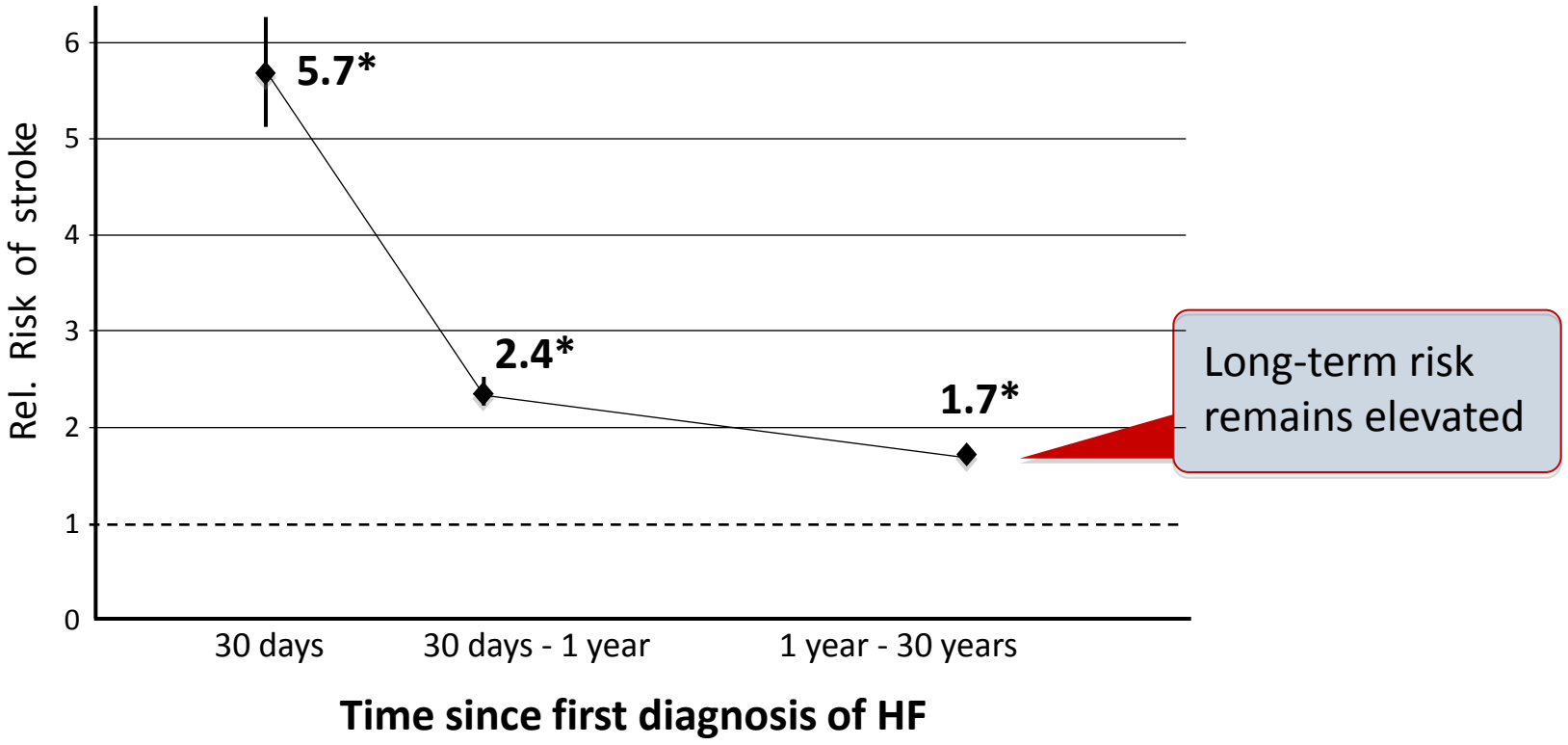
Alberts VP *et al.* Eur J Epidemiol 2010

HF and time dependent risk of stroke

Population wide cohort study (Denmark)

Patients with first time hospitalisation for HF 1980 - 2012: n=289,353

Follow-up 1.9 years [IQR 0.2 – 5.1y]



Adelborg K *et al.* Stroke 2017

Warfarin and Aspirin in Patients with Heart Failure and Sinus Rhythm

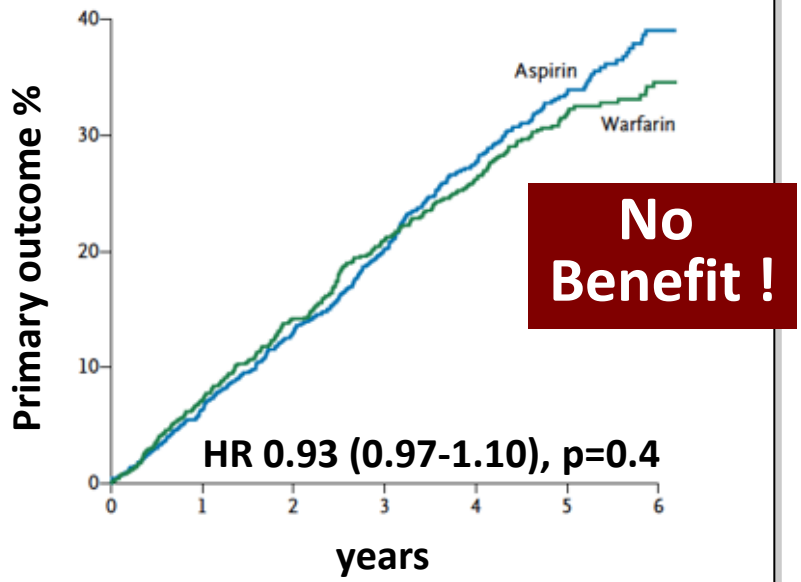
Shunichi Homma, M.D., John L.P. Thompson, Ph.D., Patrick M. Pullicino, M.D., et al.

The NEW ENGLAND JOURNAL of MEDICINE 2012

- 2002 - 2010
- N=2305, systol CHF + sinus rhythm
- mean FU 3.5y

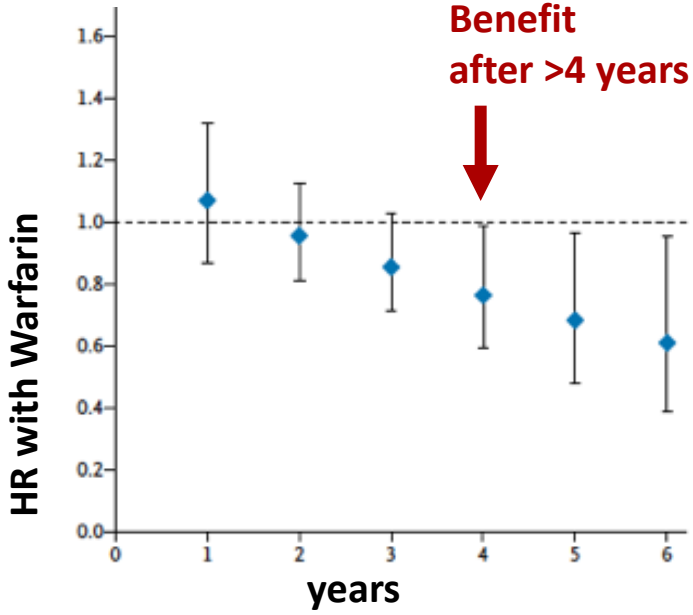
WARCEF

Primary outcome
(death, stroke, haemorrhage)



No Benefit !

Time dependent primary outcome



- Risk of stroke is highest within 30 days after HF diagnosis, but declines thereafter

Statement Pro:

- **Consequent therapy in HF patients may reduce the risk of stroke**

- The role of NOAC in HF (with sinus rhythm) needs better evidence

THANK YOU

ESC COUNCIL Stroke

wolfram.doehner@charite.de

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Council on Stroke

- Nucleus
- Events
- Membership

ESC COUNCIL ON STROKE

The Council on Stroke

While effective treatment of acute myocardial infarction substantially improved the outcomes of the vast majority of patients during the last 10-15 years, acute stroke remains a major thread with high mortality and/or permanent disability. The incidence of acute stroke is similar to the incidence of acute coronary syndromes, but the outcomes of stroke patients are significantly worse. The rising body of evidence shows, that at least 30-50% (probably even more – this depends on the diagnostic approach) of ischemic strokes are caused by the heart disease (atrial fibrillation,

https://www.escardio.org/Councils/Council-on-Stroke

CHF - complicating factor for more severe stroke

Stroke mortality >2x higher in CHF patients

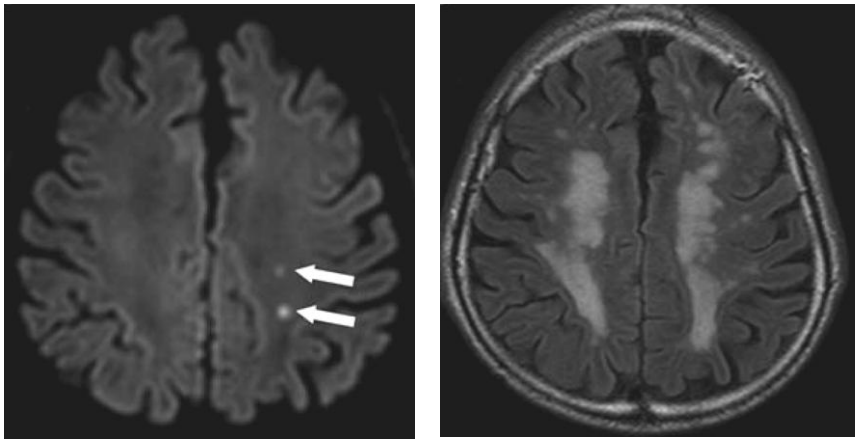
	Year	Design	n	n (Stroke)	OR (CI)
Sharma et al., 2000		retrospektive	295	51	**4,5** (2,3-9,1)
Appelros et al., 2003	1999-2000	retrospektive	377	53	**2,2** (1,4-3,5)
Divani et al., 2009	1995	retrospektive	632225	68354	**2,5** (2,4-2,7)
	2005	retrospektive	555915	68609	**2,2** (2,0-2,3)

Stroke morbidity (disability) more severe in CHF patients

	Outcome	Follow-up	n	Risik factor	OR
Appelros et al., 2003	**mRS ≥ 3**	1 year	377	↓ EF	**3,0** (1,1-8,0)
Ois et al., 2008	**mRS ≥ 3**	3 months	503	systolic Dysfunction	**3,0** (1,3-6,8)
				diastolic Dysfunction	**2,5** (1,1-5,6)

CHF - complicating factor for silent cerebral ischaemia

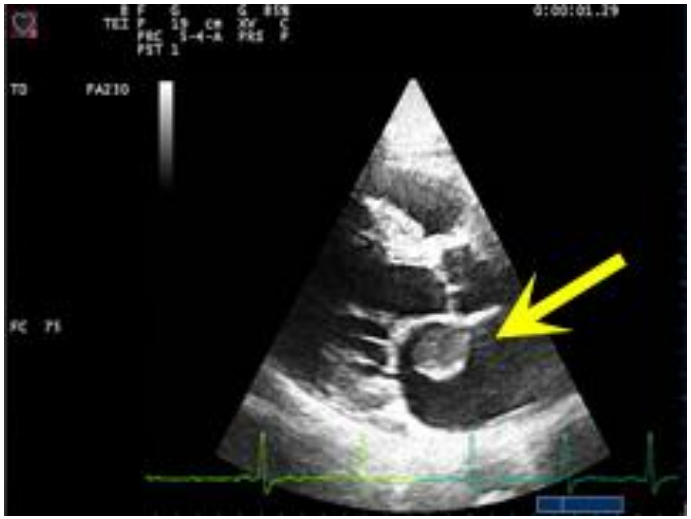
MRI imaging

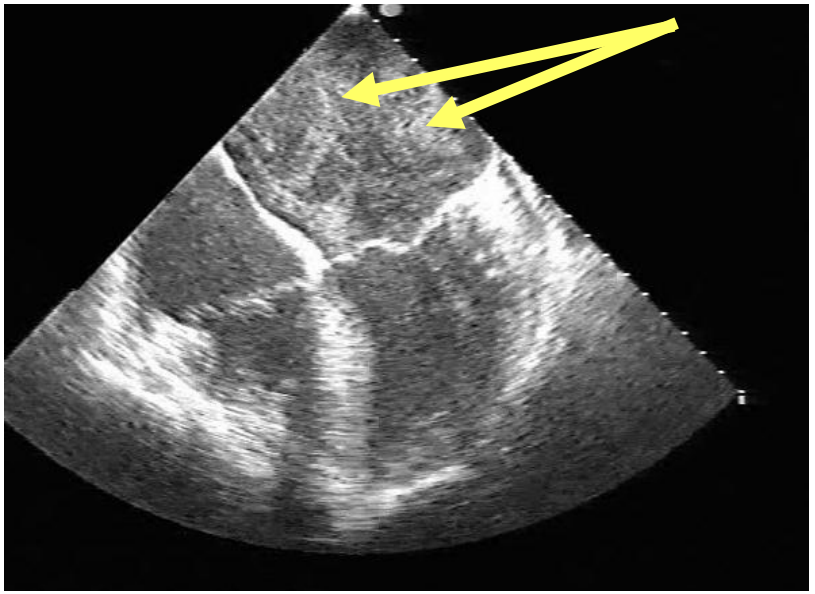


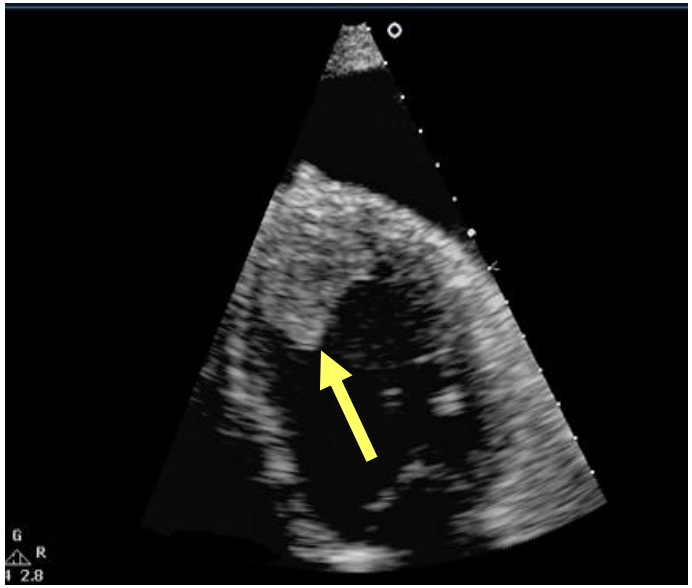
Up to 40% of patients with CHF with silent ischaemia

	n	Age y	EF %	Silent Ischaemia	
				In CHF	controls
Schmidt et al., 1991	20	40 y		**20%**	0 %
Siachos et al., 2005	117	51 y	18 %	**34 %**	-
Vogels et al., 2007	58	69 y	27 %	**42 %**	12 %
Kozdag et al., 2008	72	62y	32 %	**35 %**	3,6 %

Echocardiographic evidence of cardiac thrombus







- Large LV size
- Low (global) contractility
- Hyp-/ akinetic LV segements
- Aneurysm
- Low LV blood flow