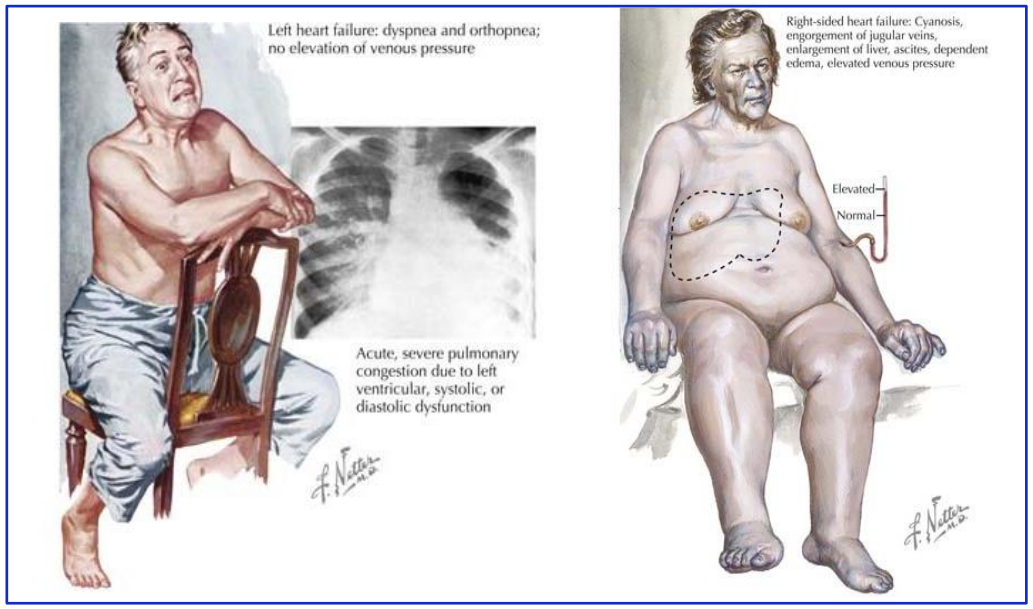
UNIVERSITÉ DE GENÈVE
FACULTÉ DE MÉDECINE

Hôpitaux Universitaires Genève

Setting the ground - What is Heart Failure ?



PD Dr Philippe Meyer
Cardiology Service
HUG

Dr Nana Poku
Cardiology Service
HUG

Advanced Heart Failure Webinars – 27.04.21

First Edition

Invitation

Advanced Heart Failure

A Swiss Webinar series

Every last Tuesday of the month (or almost), take an hour to exchange with Swiss heart failure experts. In a friendly format, you will meet experts from all over Switzerland for a dive into the state of the art of current HF-management.
Come and join us!

Program 2021	18 – 19h, Zoom-Sessions in English
April 27	**Setting the ground – What is Heart Failure** PD Dr. Philippe Meyer and Dr. Nana Poku, Hôpitaux Universitaires de Genève
May 25	**Optimizing Heart Failure treatments** PD Dr. Patrick Yerly, Centre Hospitalier Universitaire Vaudois, Lausanne
June 29	**Post-discharge risk factors for hospital readmission** tbd
August 24	**Management Strategy of HFrEF patients with worsening HF** PD Dr. Mattia Arrigo, Stadtspital Waid und Triemli, Zürich und Universität Zürich
September 28	**Latest Guidelines in Advanced HF** Prof. Dr. Andreas Flammer, Universitätsspital Zürich, Zürich
October 26	**Cardiac Amyloidosis: underestimated cause of Adv. HF** tbd
November 30	**Regaining Quality of Life – the new devices opportunities** Dr. Matthias Paul, Luzerner Kantonsspital, Luzern and PD Dr. Qian Zhou, Universitätsspital Basel, Basel

AIM and CME credits are approved (1 credit per webinar). Credits are awarded according to participation. Registration and information via QR-Code. Event run by www.fent-event.ch.

Cooperation event. Initiated, organized and financed by:

Abbott Bayer Pfizer SERVIER VIFOR PHARMA

AHFW Flyer April 2021

Consensus Statement

Universal Definition and Classification of Heart Failure

A Report of the Heart Failure Society of America, Heart Failure Association of the European Society of Cardiology, Japanese Heart Failure Society and Writing Committee of the Universal Definition of Heart Failure

Endorsed by Canadian Heart Failure Society, Heart Failure Association of India, the Cardiac Society of Australia and New Zealand, and the Chinese Heart Failure Association

BIYKEM BOZKURT, MD, PhD, Chair, ANDREW JS COATS, DM, DSC, Co-Chair, HIROYUKI TSUTSUI, MD, Co-Chair, MAGDY ABDELHAMID, MD, STAMATIS ADAMOPOULOS, MD, NANCY ALBERT, PhD, CCNS, CHFN, CCRN, NE-BC, STEFAN D. ANKER, MD, PhD, JOHN ATHERTON, MBBS, PhD, MICHAEL BÖHM, MD, JAVED BUTLER, MD, MPH, MBA, MARK H. DRAZNER, MD, MSc, G. MICHAEL FELKER, MD, MHS, GERASIMOS FILIPPATOS, MD, GREGG C. FONAROW, MD, MONA FIUZAT, PharmD, JUAN–ESTEBAN GOMEZ-MESA, MD, PAUL HEIDENREICH, MD, TERUHIKO IMAMURA, MD, PhD, JAMES JANUZZI, MD, EWA A. JANKOWSKA, MD, PhD, PRATEETI KHAZANIE, MD, MPH, KOICHIRO KINUGAWA, MD, PhD, CAROLYN S.P. LAM, MBBS, FRCP, PhD, YUYA MATSUE, MD, PhD, MARCO METRA, MD, TOMOHITO OHTANI, MD, PhD, MASSIMO FRANCESCO PIEPOLI, MD, PhD, PIOTR PONIKOWSKI, MD, PhD, GIUSEPPE M.C. ROSANO, MD, PhD, YASUSHI SAKATA, MD, PhD, PETAR SEFEROVIĆ, MD, PhD, RANDALL C. STARLING, MD, MPH, JOHN R. TEERLINK, MD, ORLY VARDENY, PharmD, MS, KAZUHIRO YAMAMOTO, MD, PhD, CLYDE YANCY, MD, MSc, JIAN ZHANG, MD, PhD, AND SHELLEY ZIEROTH, MD

Bozkurt B et al. J Cardiac Fail 2021;27:387-413.

Potential conflicts of interest

- Participation in advisory boards and seminars organised by **Abbott, AstraZeneca, Bayer, Boehringer Ingelheim, Novartis, Pfizer, Vifor, Servier**
- **No personal fee**
- Honoraria entirely paid to a private research foundation of the Cardiology Service of the University Hospitals of Geneva (**GEcor foundation**) since 2015

Plan

Clinical vignette #1: « when everything runs smoothly »

Epidemiology of HF in 3 slides

New universal definition of HF

New classification of HF

Recent diagnostic algorithm of HFpEF

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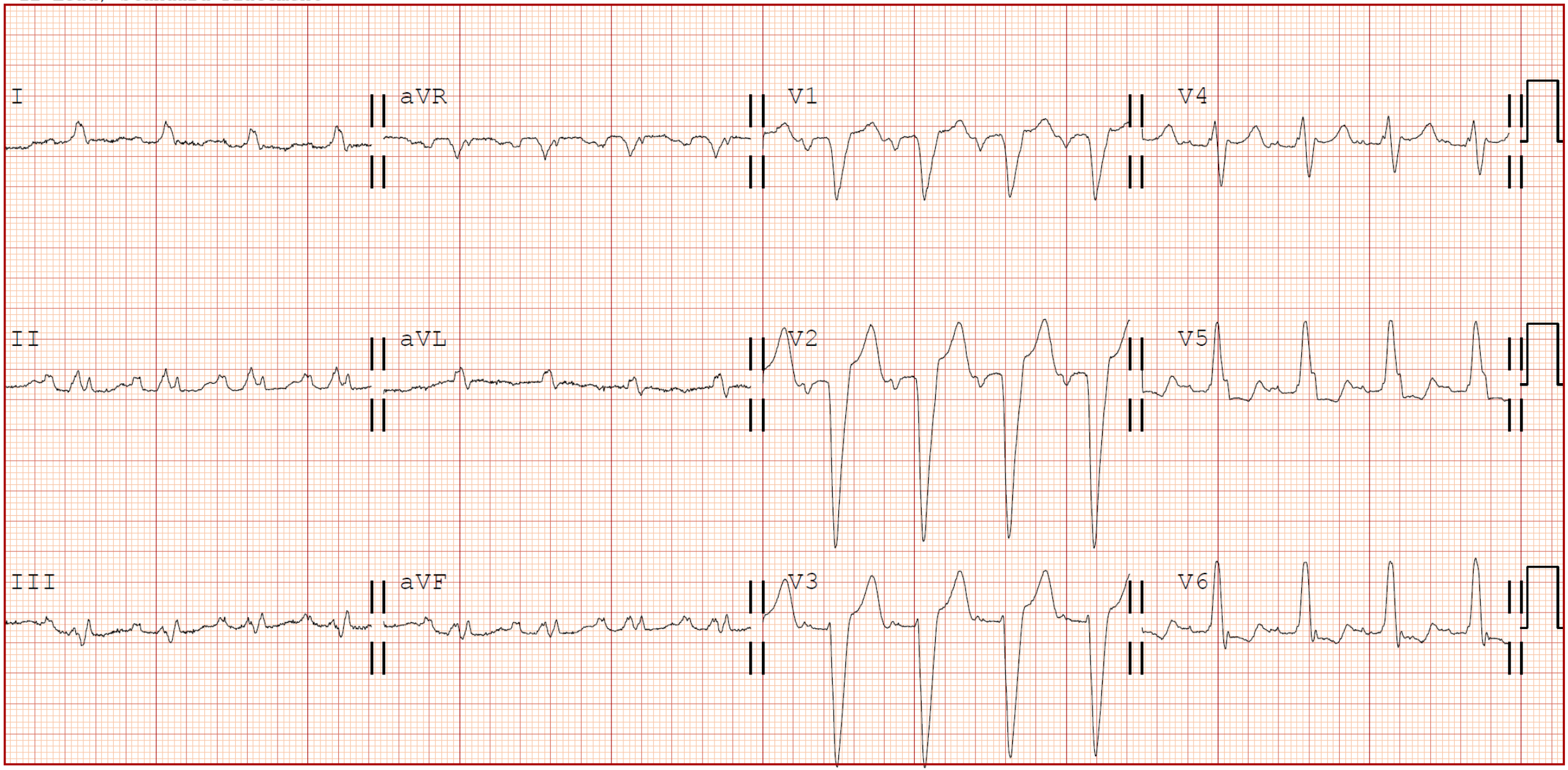
Clinical vignette: Mrs C. N. 1946 – Admission September 2017

Past medical history	• Retired nurse • Influenza infection 01.2017 • Inguinal hernia surgery 08.2017 • Chronic venous insufficiency, varices' surgery
History of present illness	• **Progressive dyspnea** in the last 3 months, currently NYHA class III/IV • **Swollen legs** for 2 weeks
Risk factors	• «Social drinker» (1 glass of wine/day) • Sedentary lifestyle
Medications	• None
Physical exam	• BP 112/81 mmHg. **HR 105** bpm. RR 18/min. **SaO_2: 89%** on room air • **Elevated JVP. Laterally displaced apical impulse. Mild pedal oedema. Bibasilar pulmonary rales** • Presence of **S3**, 2/6 apical **holosystolic murmur**

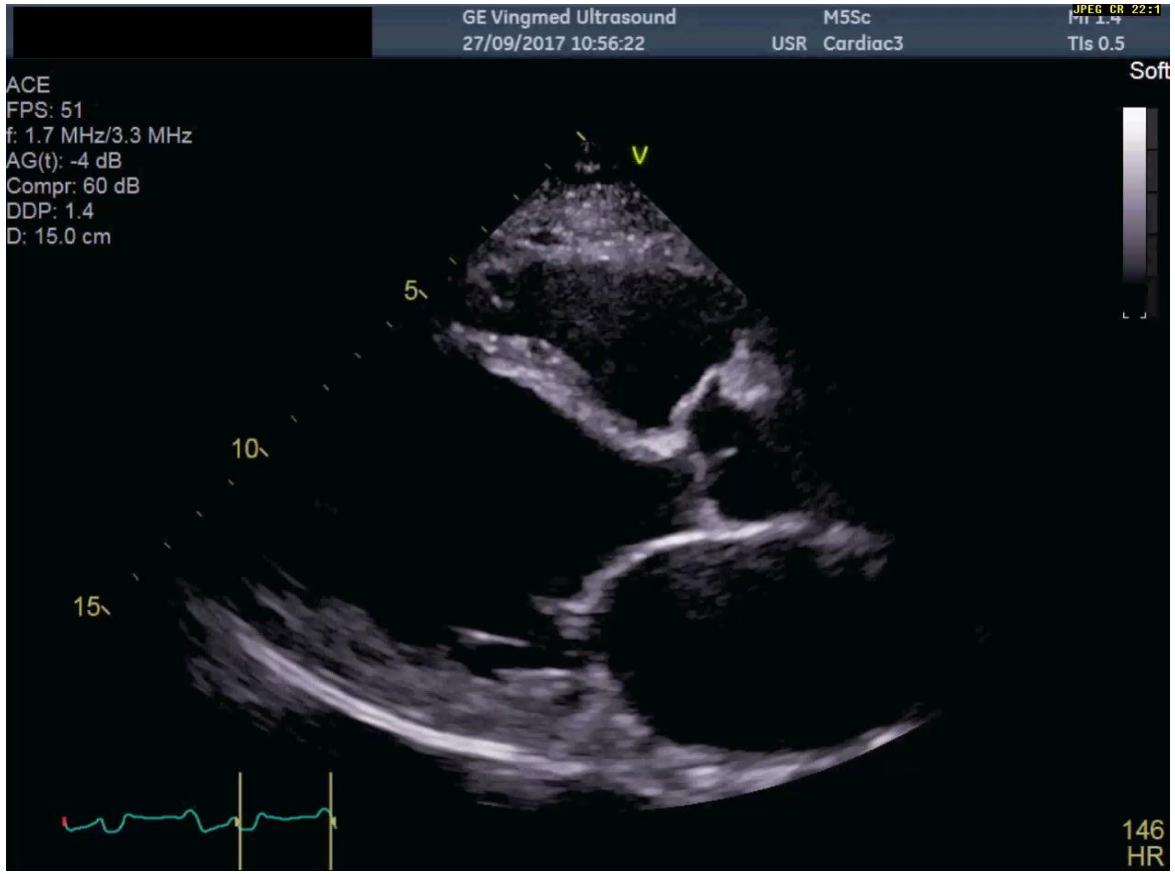
12 Lead; Standard Placement



Device: 091739 Speed: 25 mm/sec Limb: 10 mm/mV Chest: 10 mm/mV 50~ 0.5-100 Hz W PH110C CL P?

Mrs C. N. 1946 : laboratory tests

- Normal blood count
- Na 142 mmol/l. K 3.6 mmol/l
- Creatinine: 81 µmol/l, GFR (CKD-EPI) 64 ml/min/1.73 m^2
- Normal thyroid function tests, normal iron work-up
- **NT-proBNP: 8801 ng/mL**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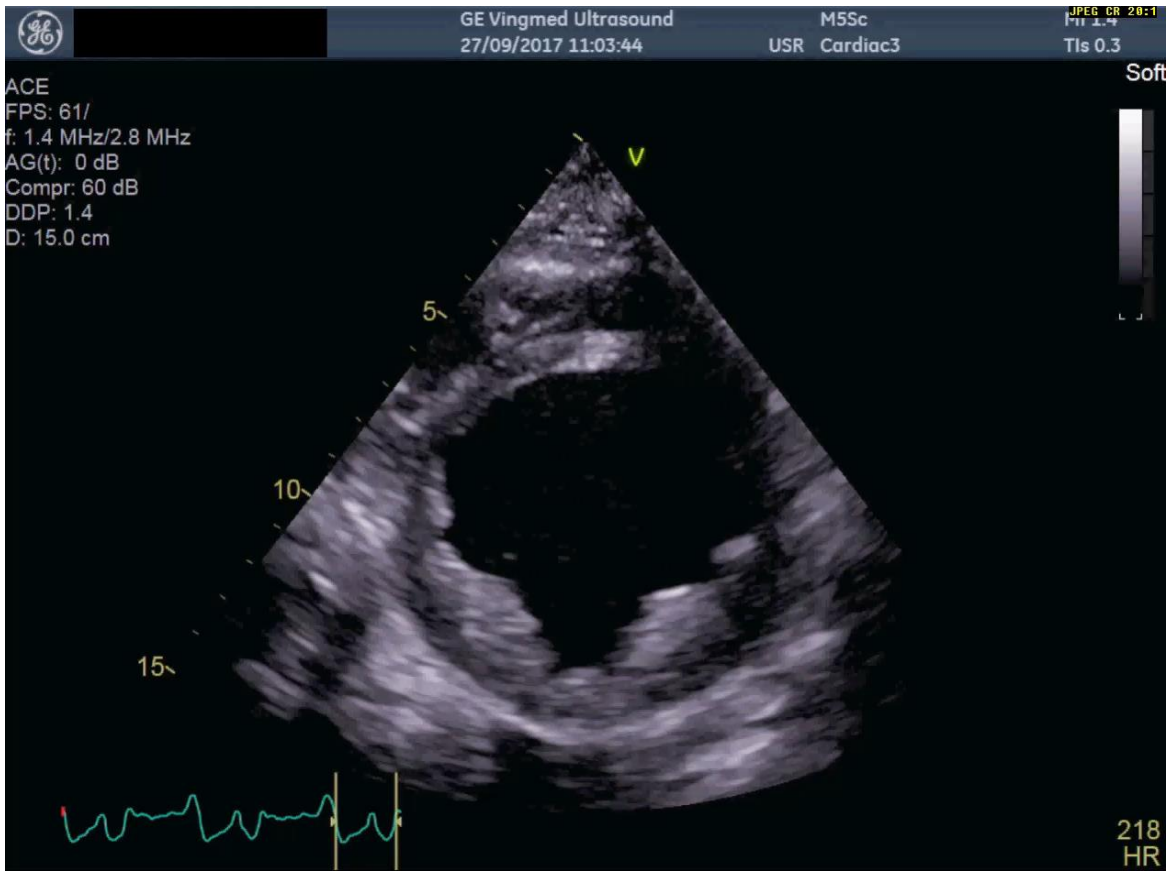
M5Sc
USR Cardiac3
JPEG CR 22:1
TIs 0.5
Soft
ACE
FPS: 51
f: 1.7 MHz/3.3 MHz
AG(t): -4 dB
Compr: 60 dB
DDP: 1.4
D: 15.0 cm
5
10
15
146
HR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USR Cardiac3
JPEG CR 20:1
TIs 0.3
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ACE
FPS: 61/
f: 1.4 MHz/2.8 MHz
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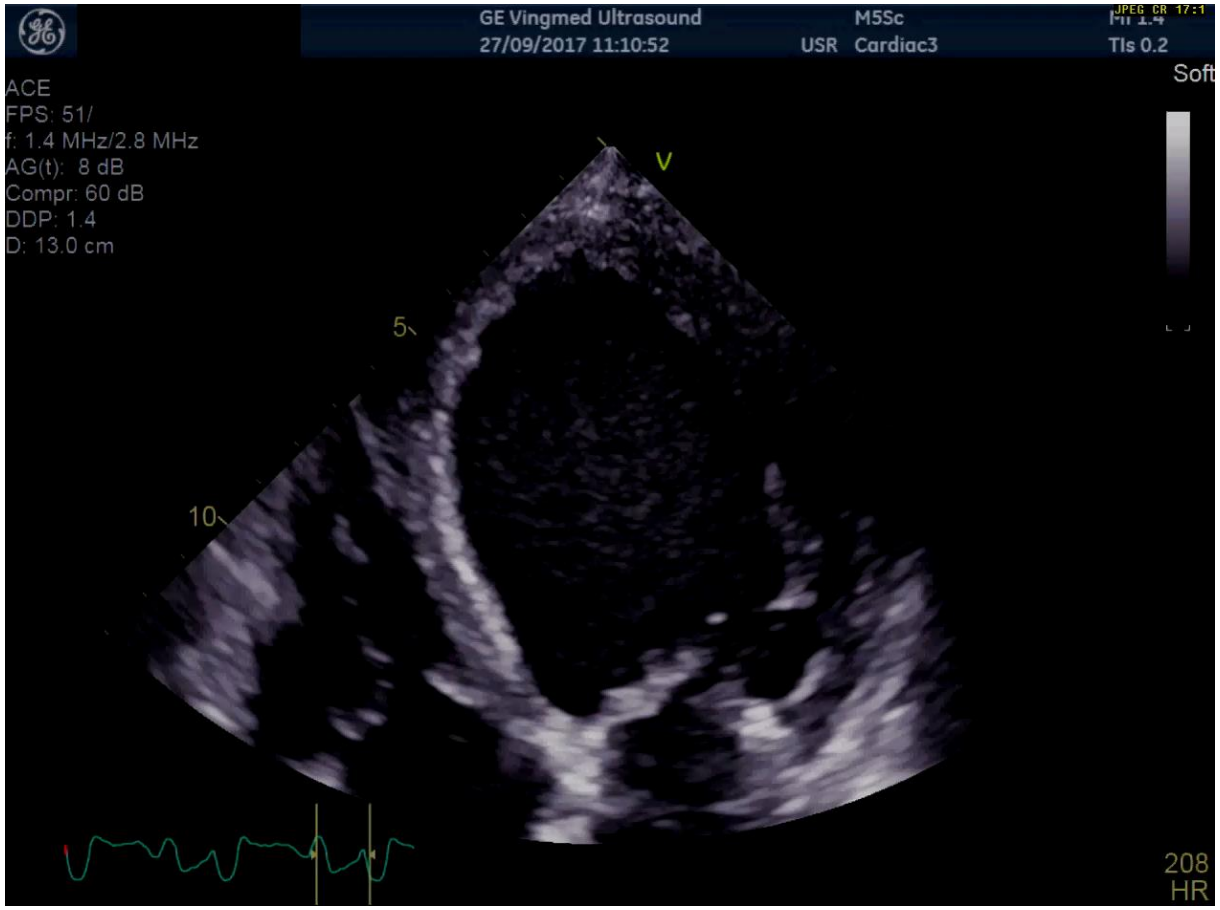
Compr: 60 dB
DDP: 1.4
D: 15.0 cm
5
10
15
218
HR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M5Sc
USR Cardiac3
TIs 0.2
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ACE
FPS: 51/
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AG(t): 8 dB
Compr: 60 dB
DDP: 1.4
D: 13.0 cm
V
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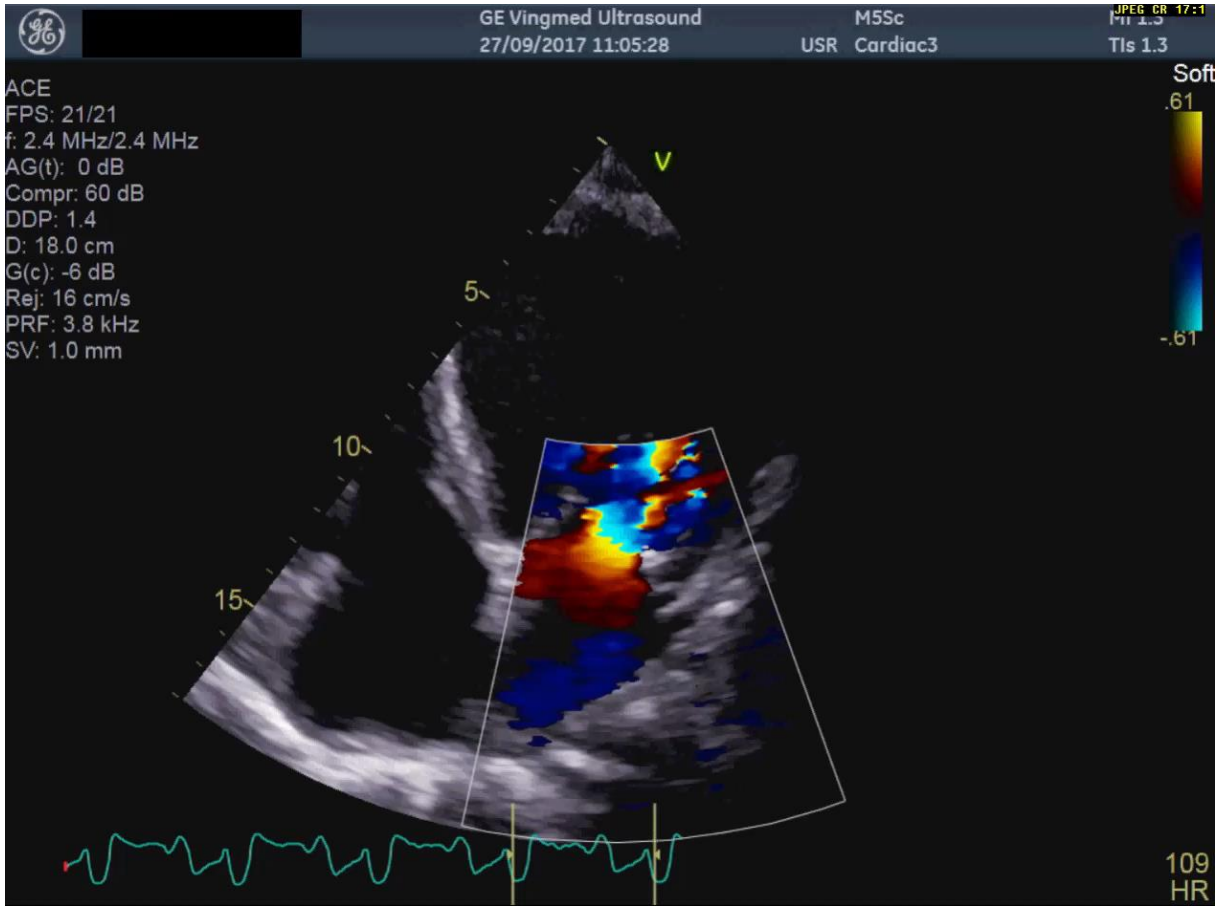
10
208
HR


GE Vingmed Ultrasound
27/09/2017 11:05:28
M5Sc
USR Cardiac3
TIs 1.3
Soft
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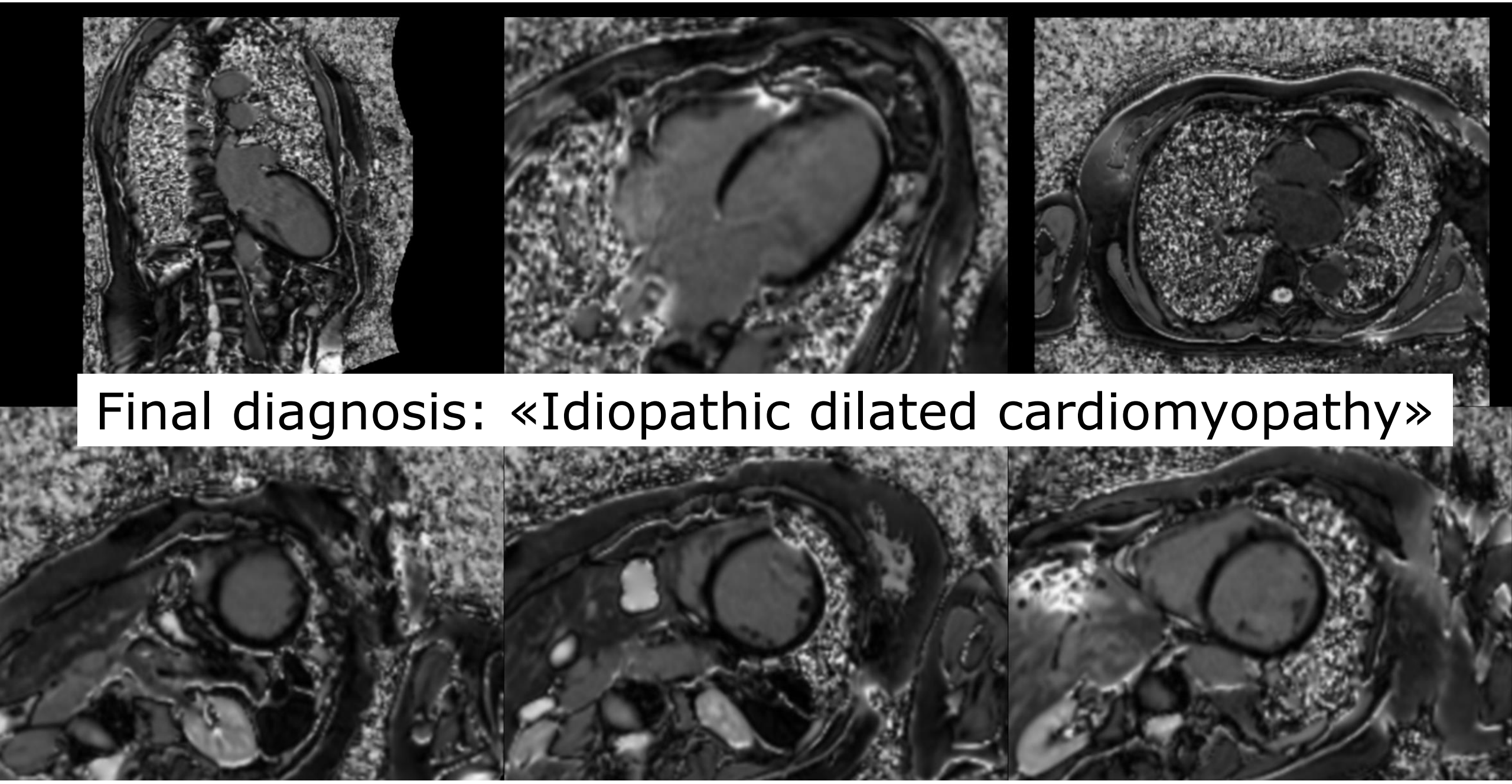
-.61
ACE
FPS: 21/21
f: 2.4 MHz/2.4 MHz
AG(t): 0 dB
Compr: 60 dB
DDP: 1.4
D: 18.0 cm
G(c): -6 dB
Rej: 16 cm/s
PRF: 3.8 kHz
SV: 1.0 mm
V
5
10
15
109
HR



Final diagnosis: «Idiopathic dilated cardiomyopathy»

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Epidemiology of HF in 3 slides

New universal definition of HF

New classification of HF

Recent diagnostic algorithm of HFpEF

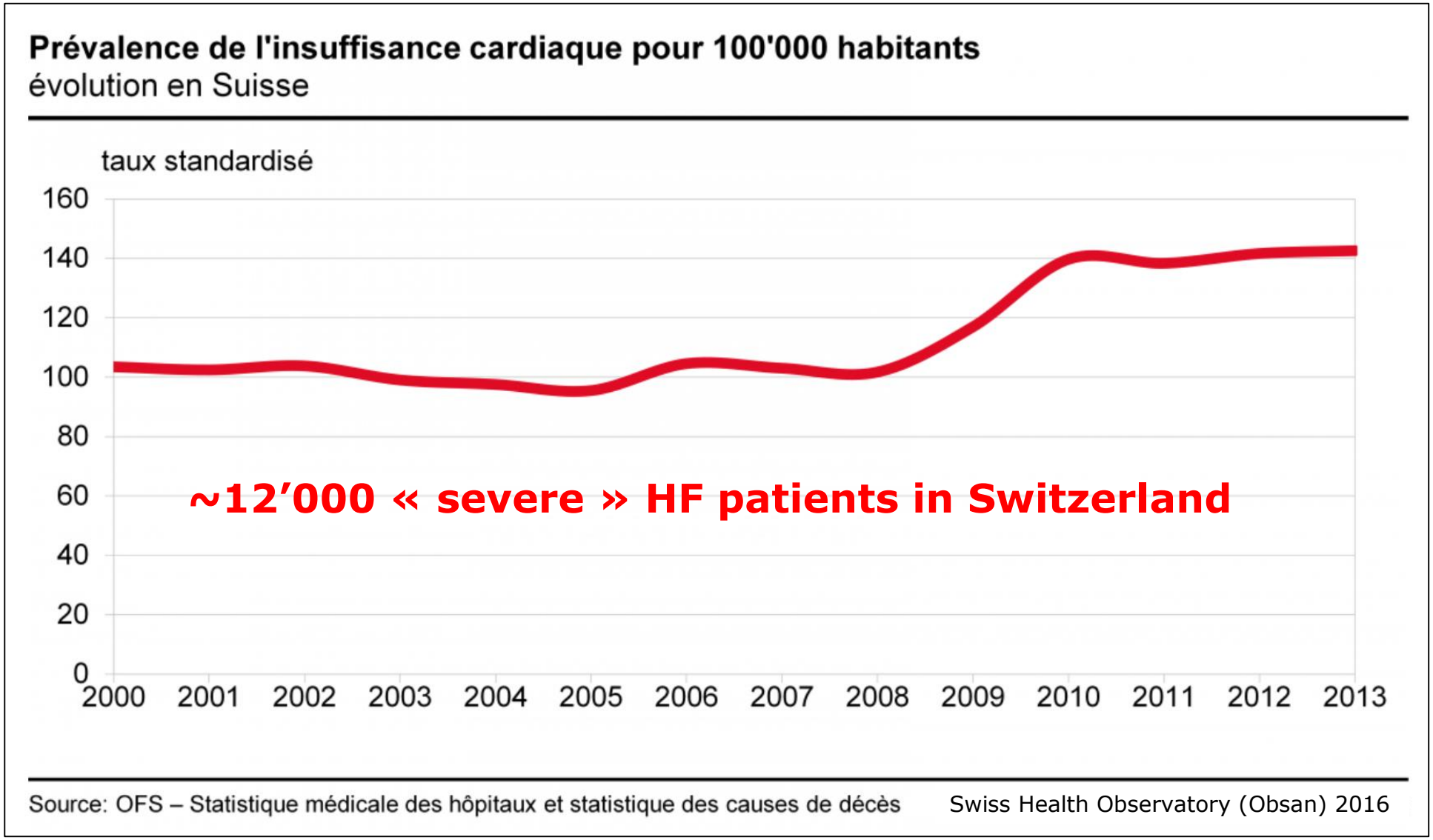
Organization of heart failure management in European Society of Cardiology member countries: survey of the Heart Failure Association

Country	Prevalence
France	2.2%
Italy	3.5%
Belgium	2-3%

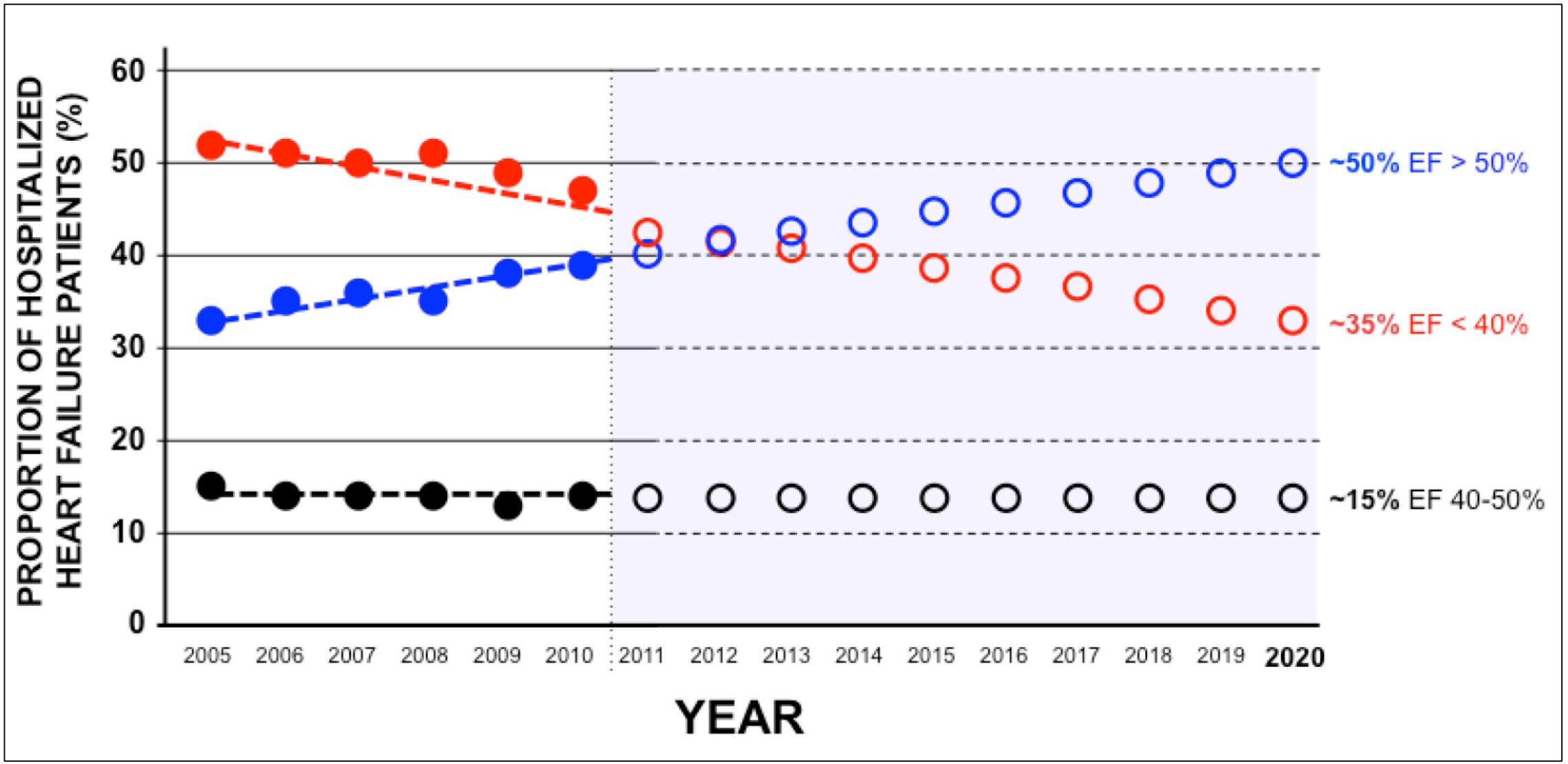
Switzerland	2-3%: ≈160’000 – 240’000

Seferovic PM et al. European Journal of Heart Failure 2013;15:947-959.

HF prevalence in CH: standardized rate of patients *hospitalized or deceased* due to HF



Prevalence trends in HF subtypes



HUG

50%

35%

15%

Oktay et al. Curr Heart Fail Rep 2013

Geneva University Hospital Heart Failure Registry Data, Courtesy S. Carballo

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Current ESC definition of HF

HF is a **clinical syndrome** characterized by:

- **typical symptoms** (e.g. dyspnea, ankle swelling, fatigue)

that may be accompanied by

- **signs** (e.g. elevated jugular venous pressure, pulmonary crackles and peripheral oedema)

caused by

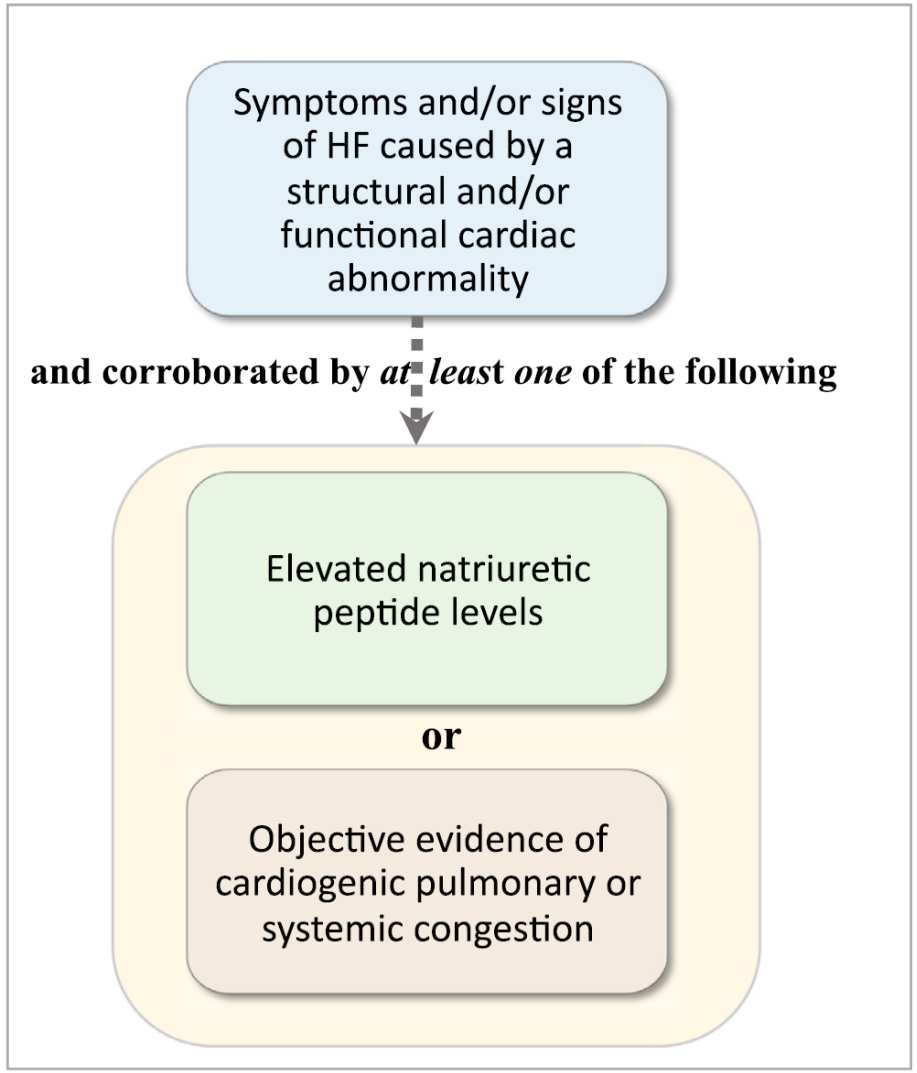
- **a structural and/or functional cardiac abnormality**

resulting in

- **a reduced cardiac output** *and/or* **elevated intracardiac pressures at rest or during stress**

Ponikowski P et al. Eur Heart J 2016;37:2129–2200.

New proposed universal definition of HF



Bozkurt B et al. J Cardiac Fail 2021;27:387-413.

HF is a **clinical syndrome**
with **current or prior symptoms and/or signs**
caused by a **structural and/or functional cardiac abnormality**
(as determined by an EF<50%, abnormal cardiac chamber enlargement, E/e'>15, moderate/severe ventricular hypertrophy or moderate/severe valvular obstructive or regurgitant lesion)
and corroborated by **at least one of the following**:

- **Elevated natriuretic peptide levels** (BNP/NT-proBNP ambulatory ≥35/≥125 and hospitalized or decompensated ≥100/≥300 ng/L)

- **Objective evidence of cardiogenic pulmonary or systemic congestion*** by diagnostic modalities, such as **imaging** (eg, by chest radiograph or elevated filling pressures by echocardiography) or **hemodynamic measurement** (eg, right heart catheterization, pulmonary artery catheter) **at rest or with provocation** (eg, exercise)

*elevated JVP estimate by an experienced clinician could be accepted as an objective evidence of systemic congestion

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Current ESC classification according to LVEF

Type of HF		HFrEF	HFmrEF	HFpEF
CRITERIA	1	Symptoms ± Signs[a]	Symptoms ± Signs[a]	Symptoms ± Signs[a]
	2	LVEF <40%	LVEF 40–49%	LVEF ≥50%
	3	–	1. Elevated levels of natriuretic peptides[b]; 2. At least one additional criterion: a. relevant structural heart disease (LVH and/or LAE), b. diastolic dysfunction (for details see Section 4.3.2).	1. Elevated levels of natriuretic peptides[b]; 2. At least one additional criterion: a. relevant structural heart disease (LVH and/or LAE), b. diastolic dysfunction (for details see Section 4.3.2).

Ponikowski P et al. Eur Heart J 2016;37:2129–2200.

New classification of HF according to LVEF

HF with reduced EF (HFrEF):

- HF with LVEF ≤ 40%

HF with mildly reduced EF (HFmrEF):

- HF with LVEF 41-49%

HF with preserved EF (HFpEF):

- HF with LVEF ≥ 50%

HF with improved EF (HFimpEF):

- HF with a baseline LVEF ≤ 40%, a ≥ 10 point increase from baseline LVEF, and a second measurement of LVEF > 40%

Bozkurt B et al. J Cardiac Fail 2021;27:387-413.

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ESC European Society of Cardiology

European Heart Journal (2019) **00**, 1–21
doi:10.1093/eurheartj/ehz641

FASTTRACK CLINICAL RESEARCH
Heart failure/cardiomyopathy

How to diagnose heart failure with preserved ejection fraction: the HFA–PEFF diagnostic algorithm: a consensus recommendation from the Heart Failure Association (HFA) of the European Society of Cardiology (ESC)

The HFA-PEFF Algorithm for the Diagnosis of HFpEF

P — Initial Workup
(Step 1 (P) : **P**retest Assessment)

- Symptoms and/or Signs of HF
- Comorbidities / Risk factors
- ECG
- Standard Echocardiography
- Natriuretic Peptides
- Ergometry / 6 min walking test
  or Cardiopulmonary Exercise Testing

E — Diagnostic Workup
(Step 2 (E) : **E**chocardiographic and Natriuretic Peptide Score)

- Comprehensive Echocardiography
- Natriuretic Peptides, if not measured in Step 1

F1 — Advanced Workup
(Step 3 (F_1) : **F**unctional testing in Case of Uncertainty)

- Diastolic Stress Test: Exercise Stress Echocardiography
- Invasive Haemodynamic Measurements

F2 — Aetiological Workup
(Step 4 (F_2) : **F**inal Aetiology)

- Cardiovascular Magnetic Resonance
- Cardiac or Non-Cardiac Biopsies
- Scintigraphy / CT / PET
- Genetic testing
- Specific Laboratory Tests

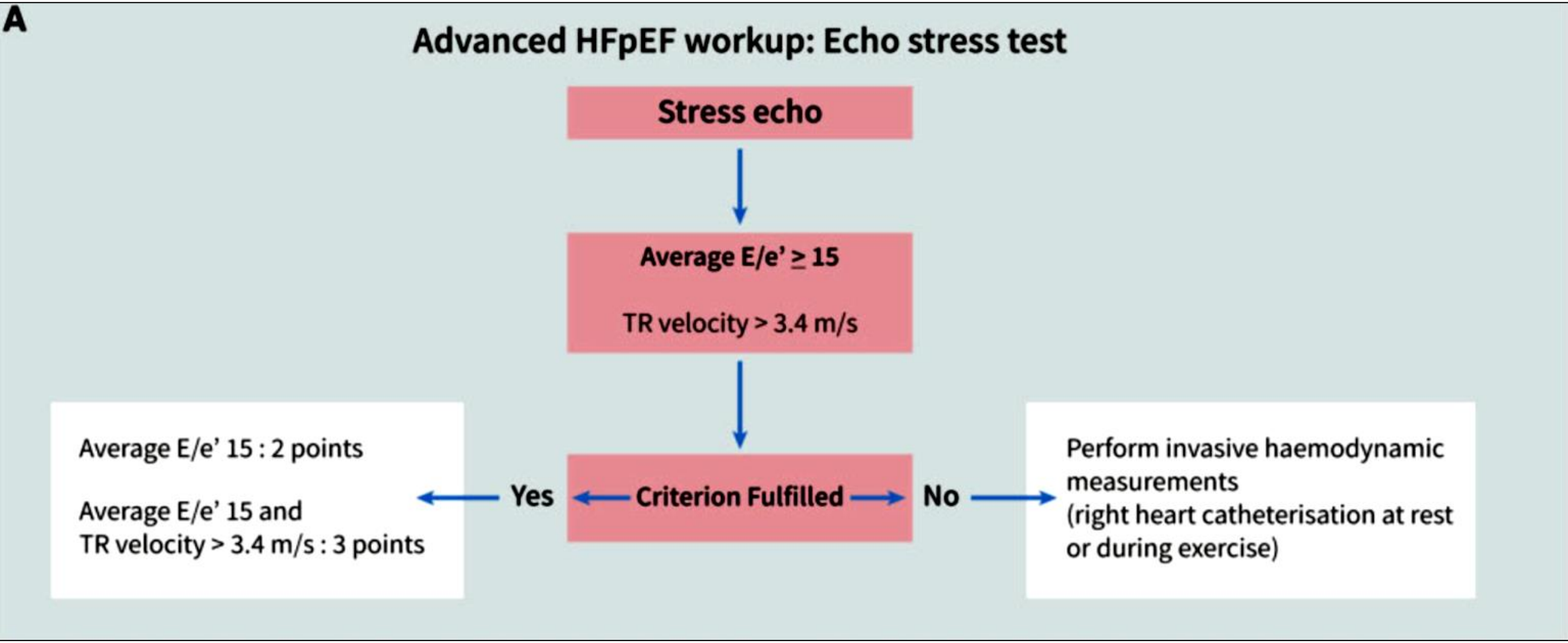
	Functional	Morphological	Biomarker (SR)	Biomarker (AF)
Major	septal e' < 7 cm/s or lateral e' < 10 cm/s or Average E/e' ≥ 15 or TR velocity > 2.8 m/s (PASP > 35 mmHg)	LAVI > 34 ml/m² or LVMI ≥ 149/122 g/m² (m/w) and RWT > 0,42 #	NT-proBNP > 220 pg/ml or BNP > 80 pg/ml	NT-proBNP > 660 pg/ml or BNP > 240 pg/ml
Minor	Average E/e' 9 -14 or GLS < 16 %	LAVI 29-34 ml/m² or LVMI > 115/95 g/m² (m/w) or RWT > 0,42 or LV wall thickness ≥ 12 mm	NT-proBNP 125-220 pg/ml or BNP 35-80 pg/ml	NT-proBNP 365-660 pg/ml or BNP 105-240 pg/ml

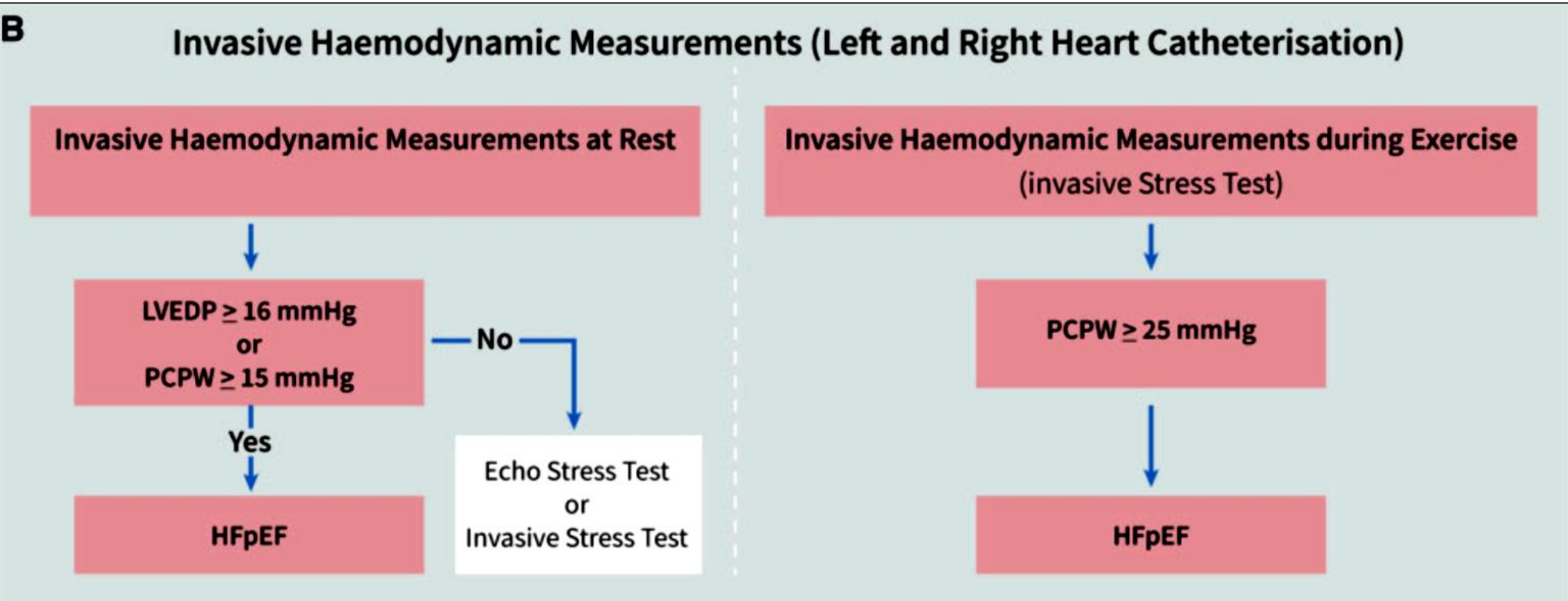
Major Criteria: 2 points

Minor Criteria: 1 point

≥ 5 points: HFpEF

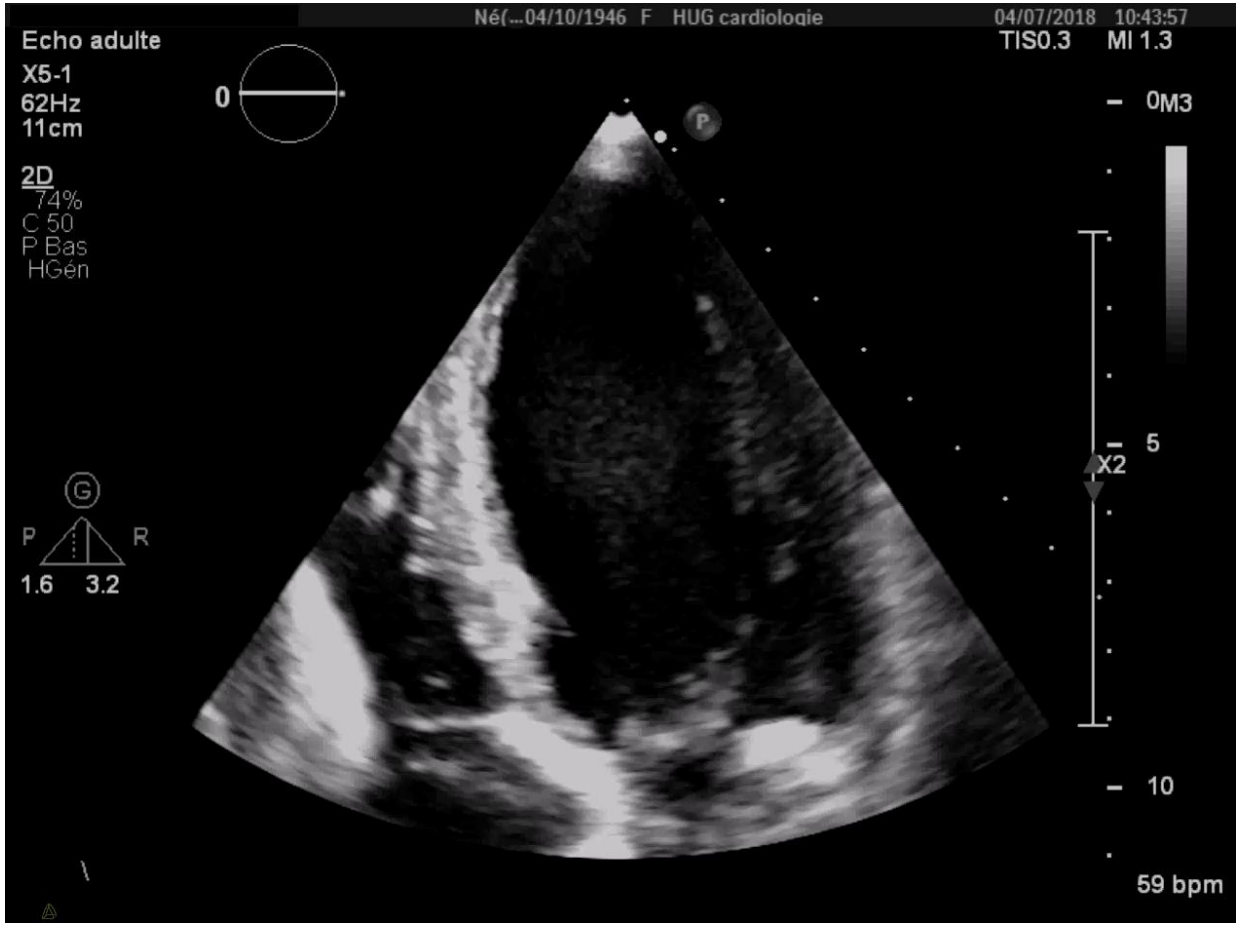
2-4 points: Diastolic Stress Test or Invasive Haemodynamic Measurements


A
Advanced HFpEF workup: Echo stress test
Stress echo
Average E/e' ≥ 15
TR velocity > 3.4 m/s
Criterion Fulfilled
Yes
Average E/e' 15 : 2 points
Average E/e' 15 and
TR velocity > 3.4 m/s : 3 points
No
Perform invasive haemodynamic measurements
(right heart catheterisation at rest or during exercise)


B
Invasive Haemodynamic Measurements (Left and Right Heart Catheterisation)
Invasive Haemodynamic Measurements at Rest
LVEDP ≥ 16 mmHg
or
PCPW ≥ 15 mmHg
No
Yes
HFpEF
Echo Stress Test
or
Invasive Stress Test
Invasive Haemodynamic Measurements during Exercise
(invasive Stress Test)
PCPW ≥ 25 mmHg
HFpEF

Back to Mrs C. N. 1946: last consult 2020

History of present illness	• Asymptomatic
Physical exam	• BP 107/65 mmHg, HR 65 bpm, No HF signs
Lab tests	• NT-proBNP 262 ng/L
Device	• CRT-D in March 2018
Medications	• Metoprolol 50 mg 1-0-0 • Sacubitril/Valsartan 100 mg 1-0-1 • Spironolactone 25 mg 1-0-0 • Dapagliflozine 10 mg 1-0-0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X5-1
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1.6 3.2
59 bpm


Né(...04/10/1946 F HUG cardiologie
04/07/2018 10:43:45
Echo adulte
TIS0.3 MI 1.3
X5-1
62Hz
11cm
2D
74%
C 50
P Bas
HGén
0M3
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X2
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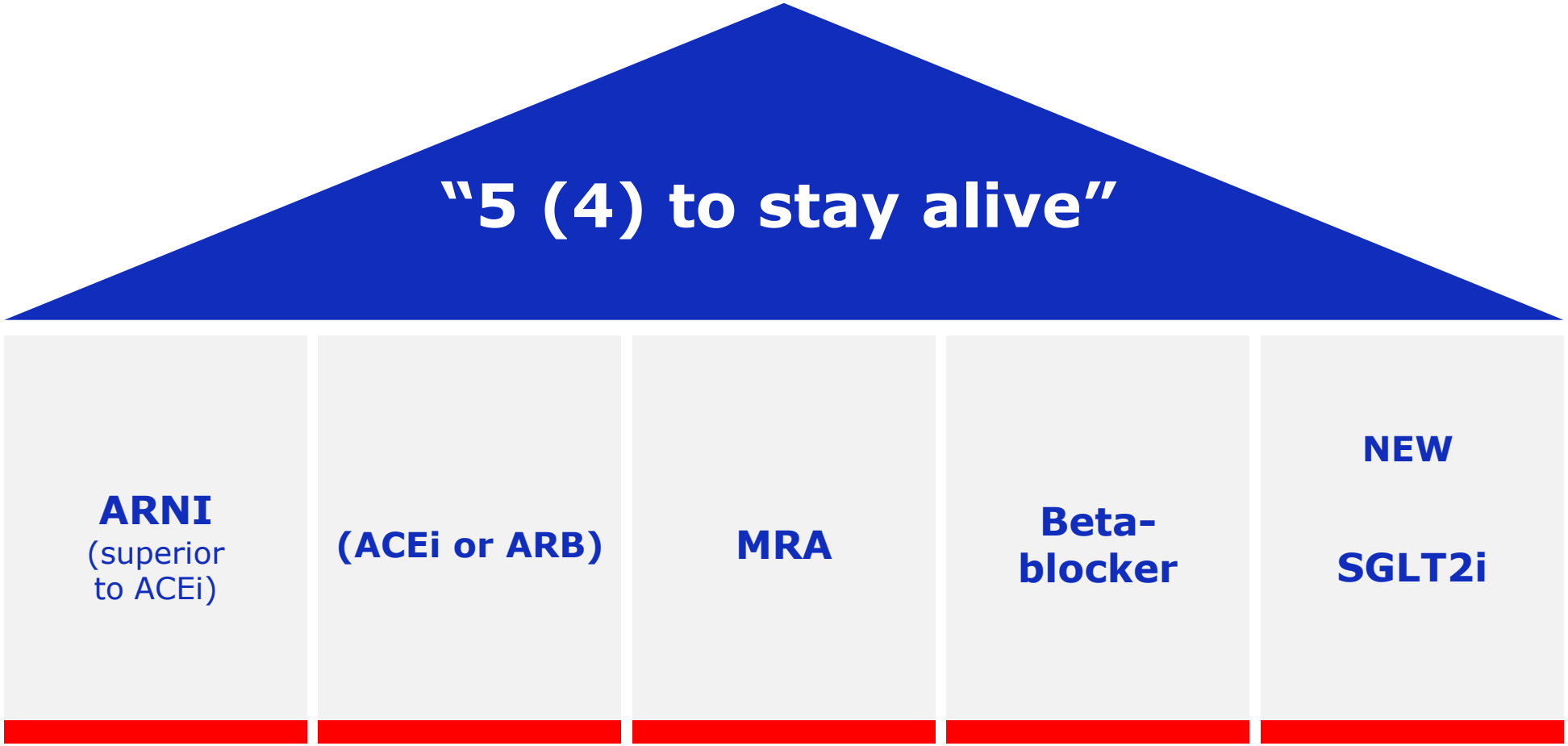
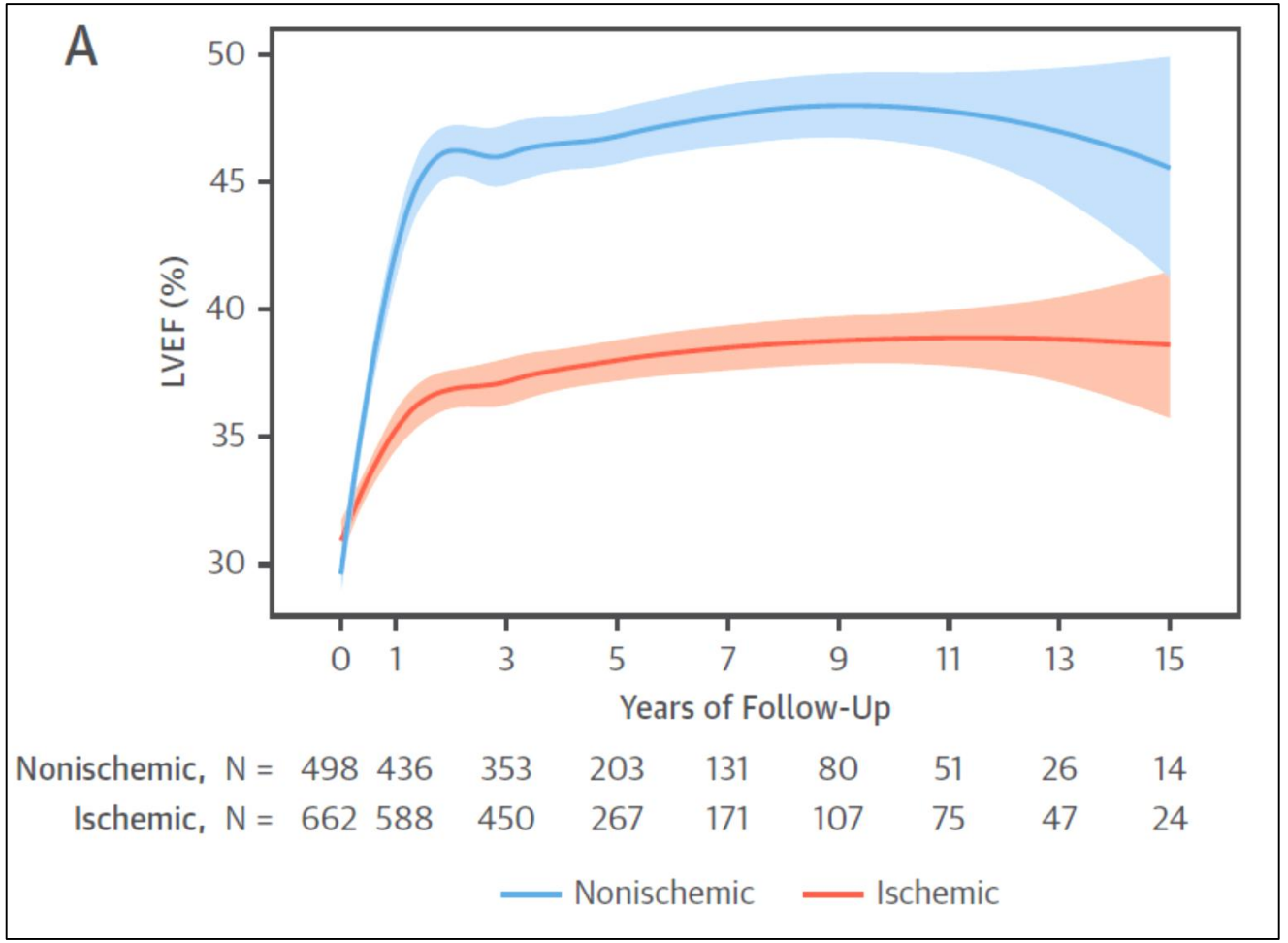
1.6 3.2
128 bpm

Drug classes that reduce mortality in HFrEF

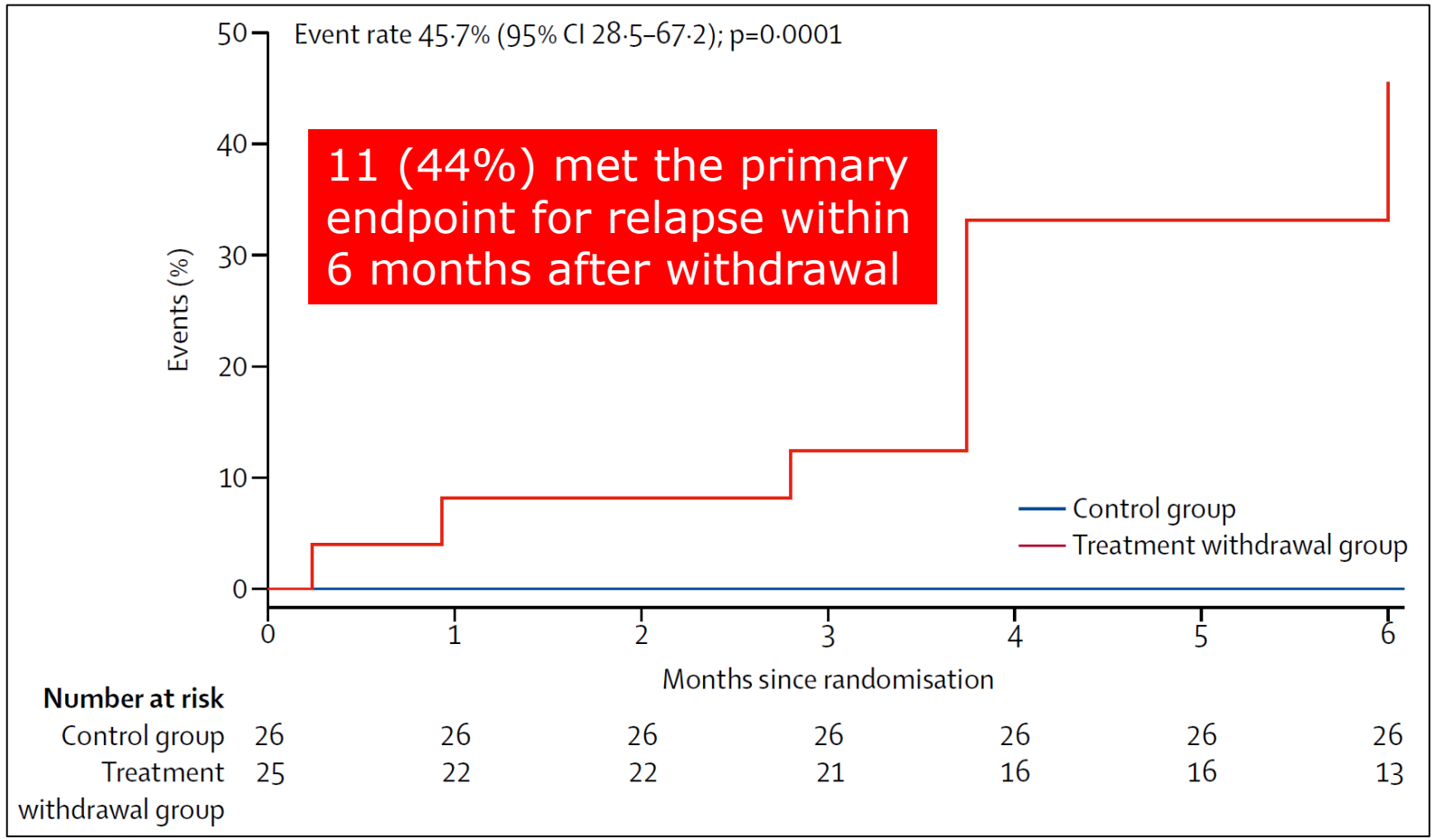


Dynamic Trajectories of Left Ventricular Ejection Fraction in Heart Failure



Lupon J et al. J Am Coll Cardiol 2018;72:591–601.

Withdrawal of pharmacological treatment for heart failure in patients with recovered dilated cardiomyopathy (TRED-HF): an open-label, pilot, randomised trial



Halliday BP et al. Lancet 2019;393:61–73.

Conclusions

- HF is **frequent** and **HFpEF** is now the **predominant** HF subtype in CH
- The new universal definition of HF **includes natriuretic peptides** (usual cut-off levels) and **objective evidence of cardiogenic pulmonary or systemic congestion** (increased JVP, imaging, RHC, etc.)
- The new classification of HF encompasses a new entity **"HF with improved LVEF"** (HFimpEF), which is defined as an improvement of >10% of LVEF with an absolute value of LVEF >40% in a patient who had a baseline LVEF ≤40%
- A new **HFpEF diagnostic algorithm (HFA-PEFF)**, has been proposed by the ESC, notably including a **new score** based on echo parameters and natriuretic peptides