



Royal College
of Physicians

CARDIO TOP TIPS FOR THE NON CARDIOLOGIST

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Consultant Cardiologist Morriston Hospital, Swansea Bay HB

Heart Failure and Imaging

DECLARATION OF INTEREST

- Engaged to an Employee of Novartis
- No consulting fees/research contracts/ investments accepted or held



AFP PHOTO/PROJECT POSSIBLE
[Mount Everest: Why the summit can get so crowded - BBC News](#)

OBJECTIVES

1. Understand THE CHANGING FACE OF CV DISEASE
2. ACHD
3. AORTIC STENOSIS
4. HEART FAILURE made easy
 - HFpEF
 - HFrEF
5. STABLE CAD AND REVIVED
6. INFECTIVE ENDOCARDITIS
7. AF



TIP 1:

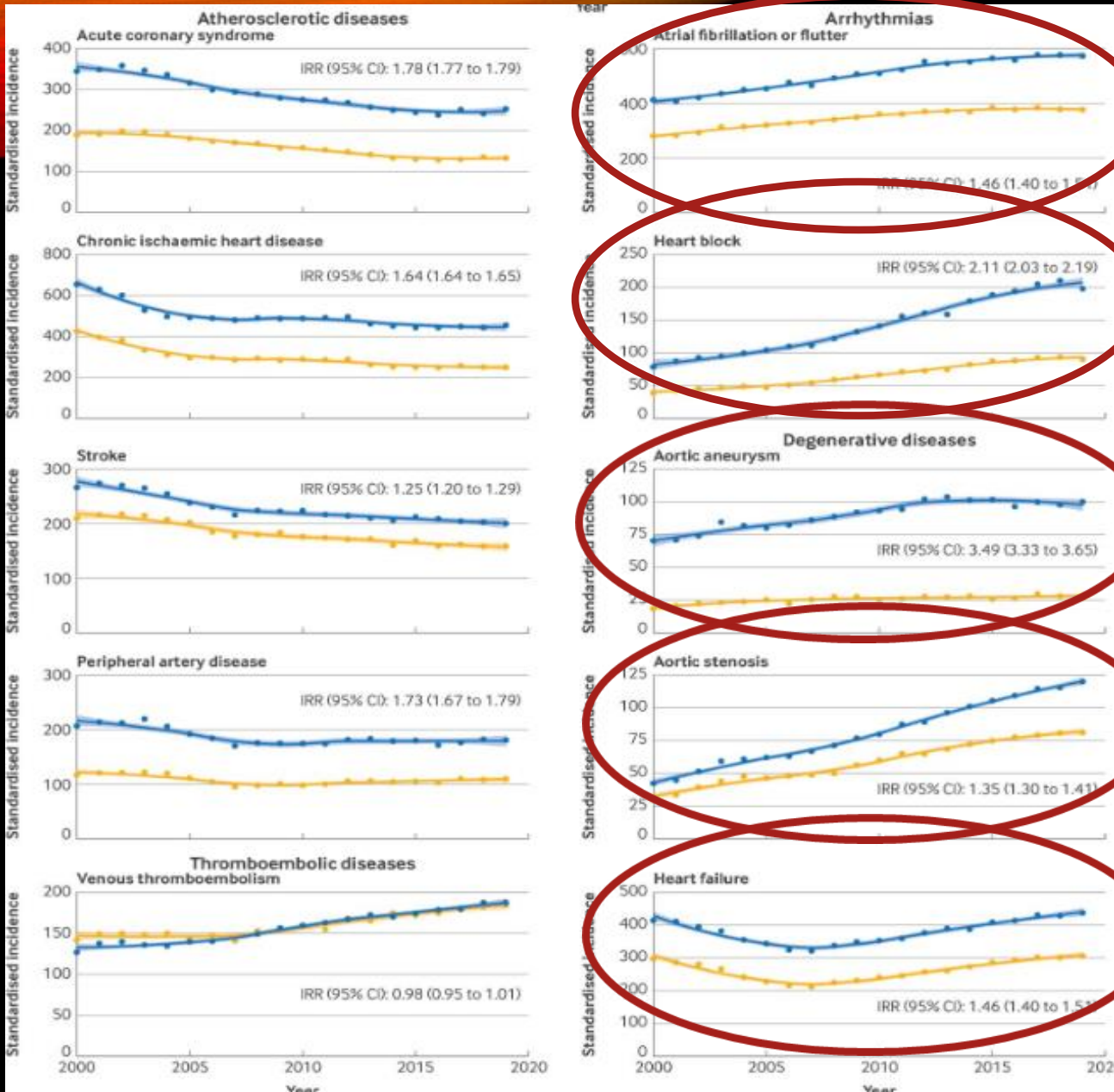
RECOGNISE THE BURDEN OF
CARDIOVASCULAR DISEASE

....AND THE CHANGING FACE OF IT

CV DISEASE IS FAR FROM DEAD....

Trends increasing of

- Arrhythmias
- Heart Block
- Aortic disease
- Heart failure
- Aortic stenosis

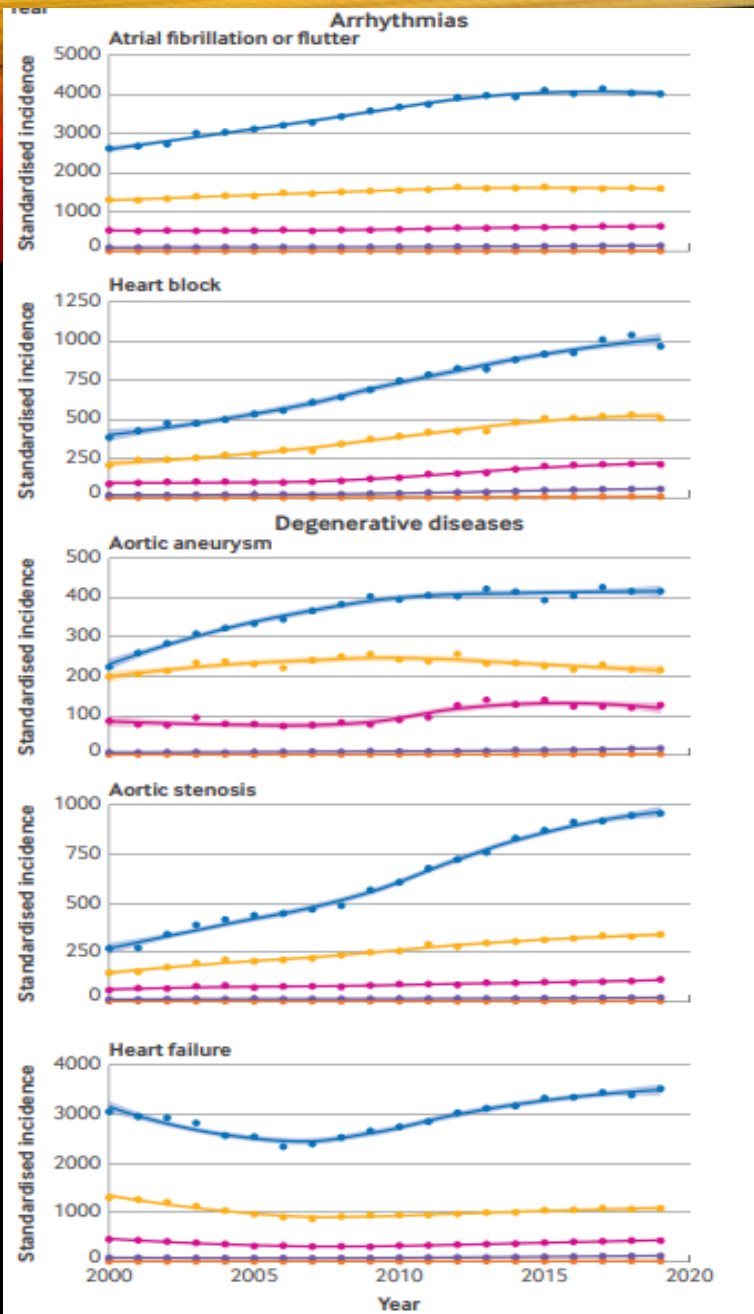


Research

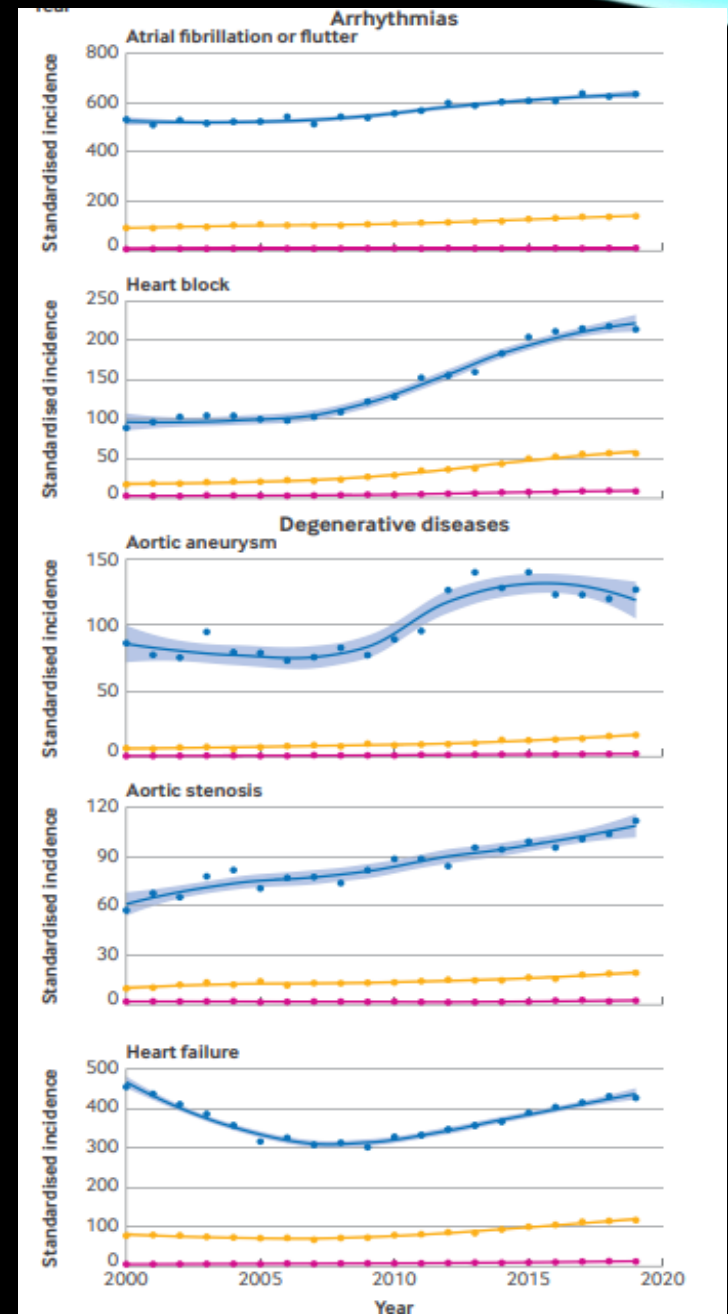
Trends in cardiovascular disease incidence among 22 million people in the UK over 20 years: population based study

BMJ 2024 ; 385 doi: <https://doi.org/10.1136/bmj-2023-078523> (Published 26 June 2024)

Cite this as: BMJ 2024;385:e078523



- Incidence is increasing in younger patients
- Reduction of aortic aneurysm ? due to screening
- HF trending up in all age groups - ? Recognition of HFpEF and the use of BNP



QUIZ 1. CARDIAC HALL OF FAME





TIP 2:

BE AWARE OF ACHD PATIENTS

ADULT CONGENITAL HEART DISEASE

It is on the rise....

Secondary service in UHW

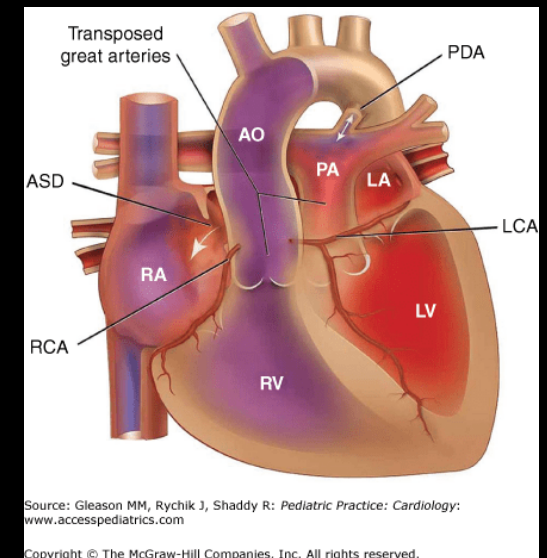
Tertiary service in Bristol

Oncall ACHD consultant out of hours (Bristol Switch)

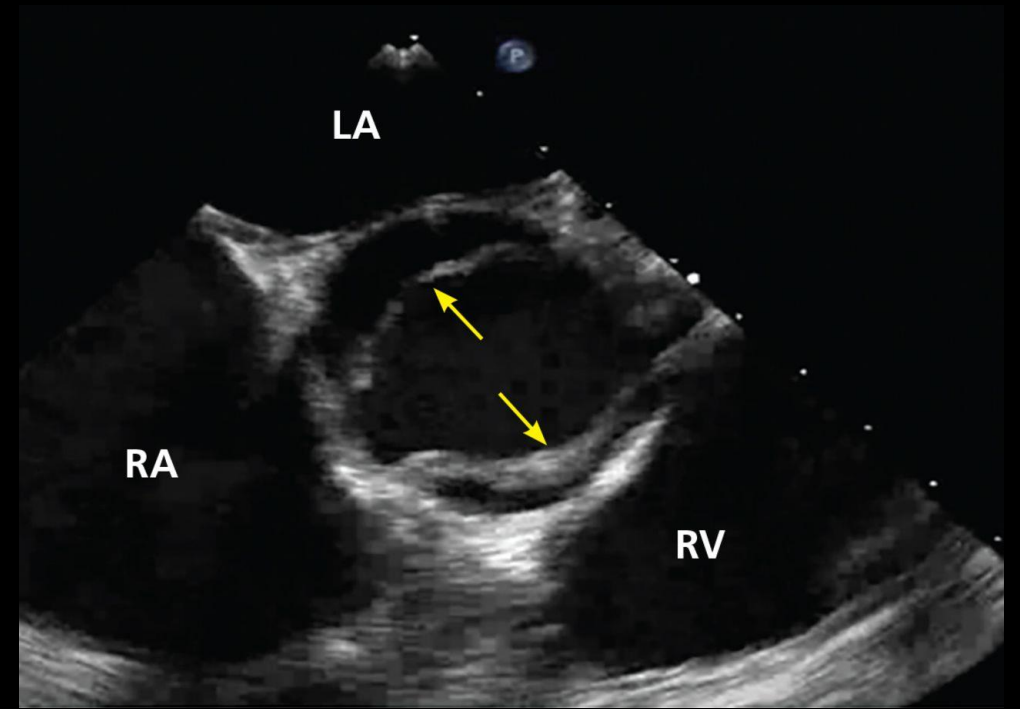
These patients are higher risk of

- **Arrhythmia**
- **Heart failure**
- **Infective endocarditis**

If you see any patients with any of these words in their PMH – discuss directly with cardiology **FONTAN, TETRALOGY, TRANSPOSITION**



QUIZ 2: ADULT CONGENITAL ECHOS

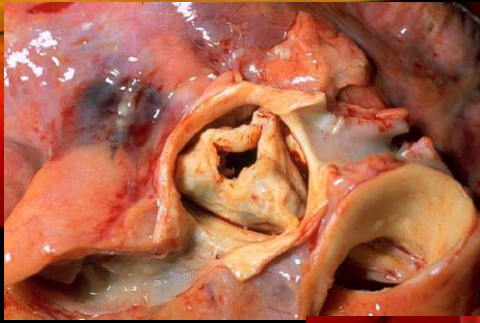




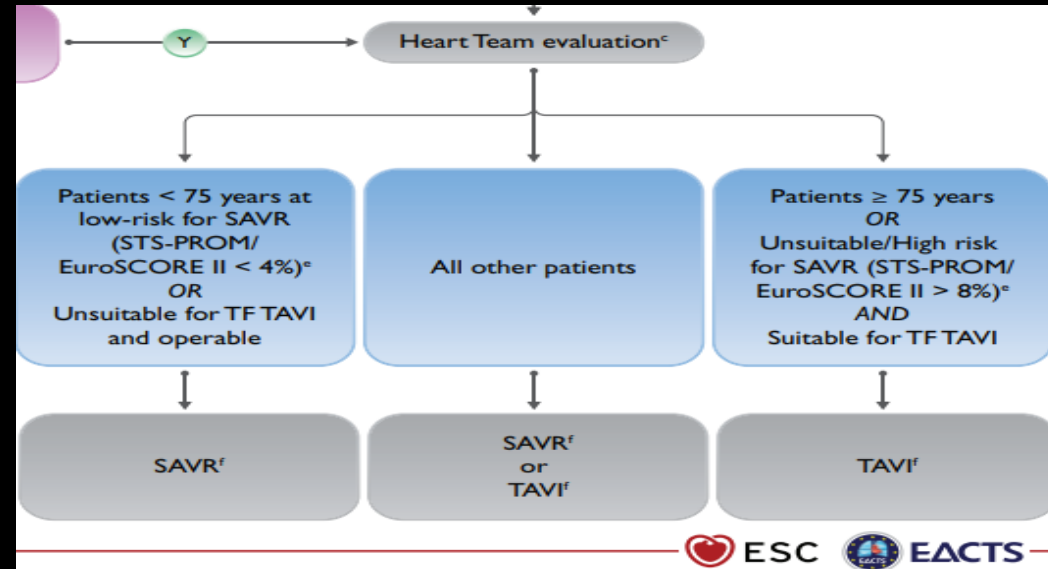
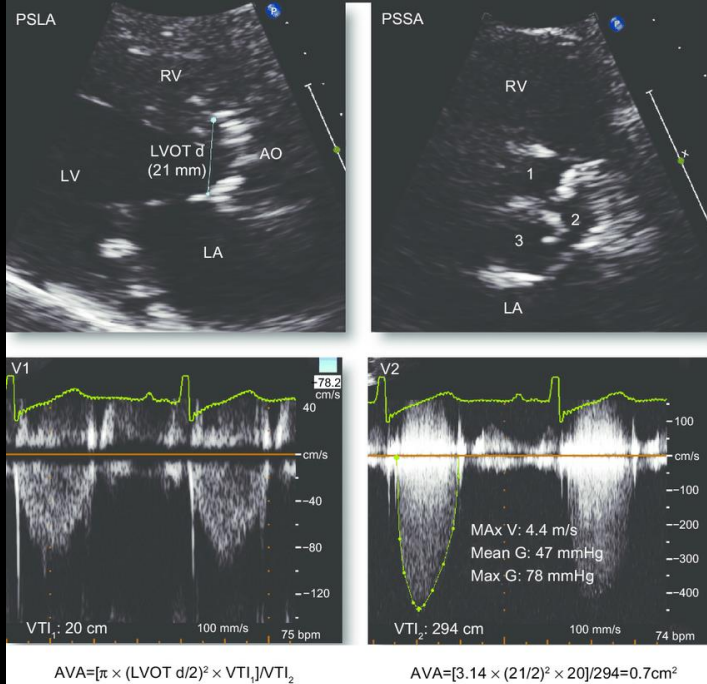
TIP 3:

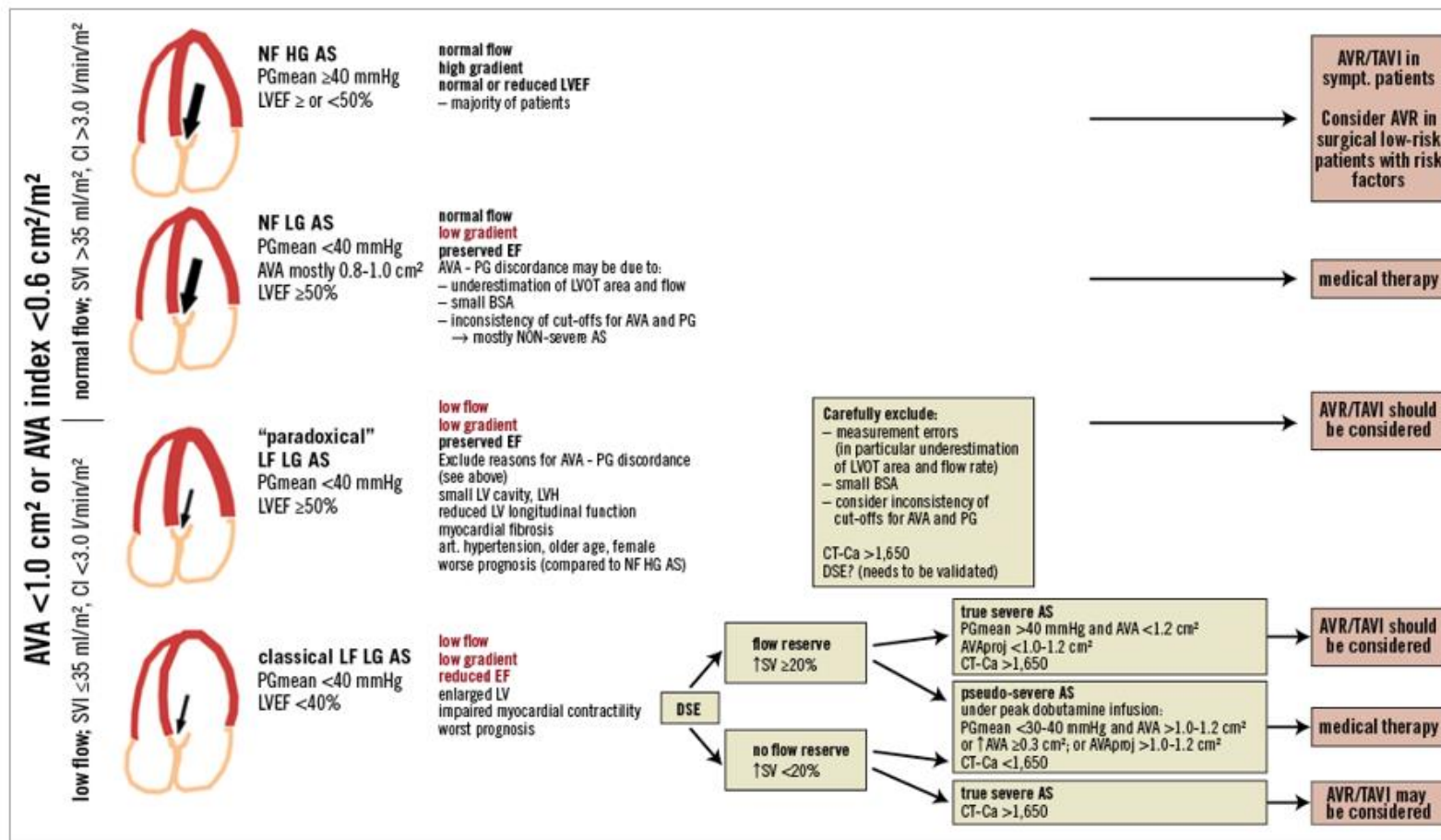
SIGNPOST ANY AORTIC STENOSIS TO
CARDIOLOGY

AORTIC STENOSIS



- Poor prognosis 50% at 2 years. 20% at 5 years
- Syncope, SOB, Chest pain
- Severe symptomatic AS = Intervention
- Conventional = AVA <1cm, V Max >4cm, MG >40mmHG
- Not every patient has conventional severe AS
- Moderate AS with discrepancies on Echo report – flag to cardiology especially if symptoms





ALL AS NEEDS FU

CENTRAL ILLUSTRATION: Mortality Associated With Untreated Aortic Stenosis

595,120 Patients With AS Assessment	AS Severity		4-Year Treatment Rates With AVR	4-Year Mortality Without AVR
	ACC/AHA Dx	Intermediate Dx		
No AS 524,342 (88.1%)	61,293 (86.6%)	9,485 (13.4%)		
AS Dx 70,778 (11.9%)	Mild AS 34,614 (48.9%)		1.0%	25.0%
	Mild-to-Moderate AS 5,796 (8.2%)		4.2%	29.7%
	Moderate AS 14,550 (20.6%)		11.4%	33.5%
	Moderate-to-Severe AS 3,689 (5.2%)		36.7%	45.7%
	Severe AS 12,129 (17.1%)		60.7%	44.9%

Généreux P, et al. J Am Coll Cardiol. 2023;82(22):2101-2109.

- Intermediate diagnoses are common in real-world practice.
- Associated with mortality similar to the next-most-severe AS grade
- Treatment of severe AS was low, and was performed in ~60% of patients up to 4 years after initial diagnosis
- Mortality risk with AS increased incrementally across the full spectrum of AS severity
- Need for earlier diagnosis, closer follow-up, and potentially earlier intervention.



TIP 4:

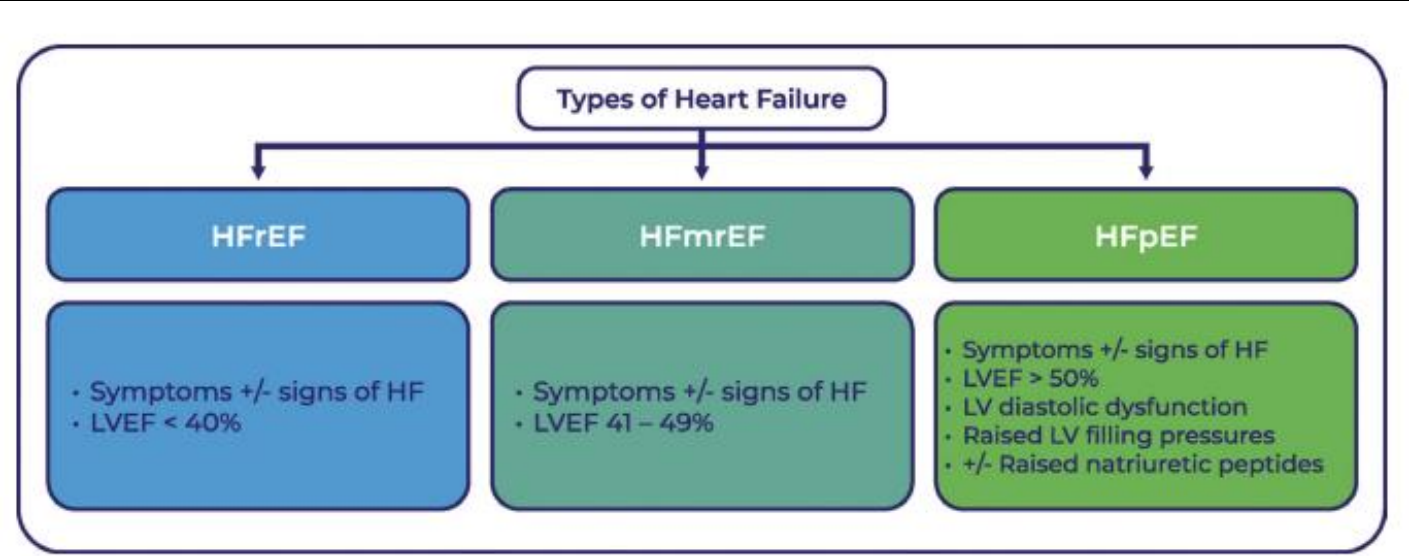
1/20 OF YOUR PATIENTS > 60 WILL
HAVE HFPEF

WE CAN NOW TREAT IT

HEART FAILURE

5 year mortality = 50-70%

NO
DIFFERENCE IN
Hospitalisation
rate, duration,
QoL



HFpEF Hallmark
= Increased LV
stiffness
associated with
impaired
relaxation

Women > men

5% > 60 year
old

Co Exist in your
patients

**NTpBNP + diastolic dysfunction
with symptoms of HF =
HFpEF**

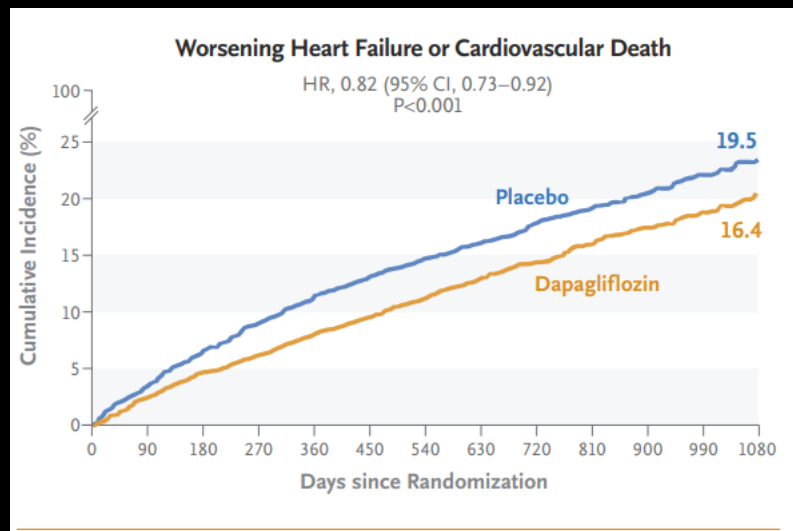
Ass.
CKD, AF, HTN,
COPD, DM,
Obesity

HFPEF THERAPIES

- Diuretics - be liberal
- SGT2 (EMPEROR –Preserved & DELIVER)

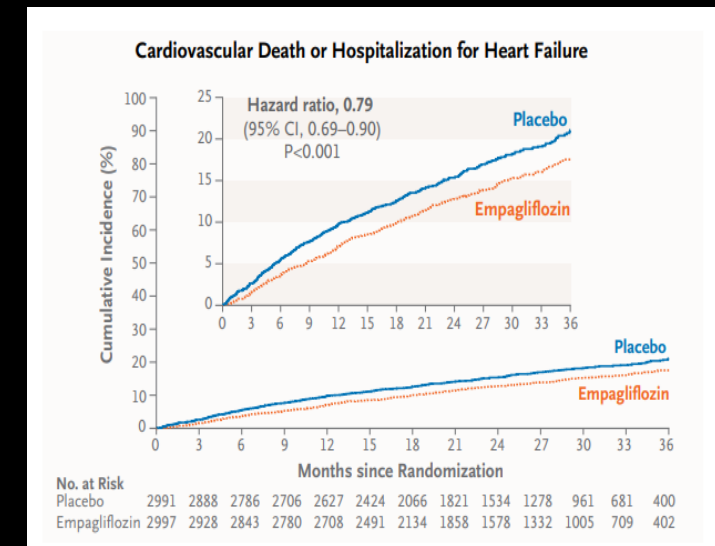
Dapagliflozin in Heart Failure with Mildly Reduced or Preserved Ejection Fraction

Solomon SD et al. DOI: 10.1056/NEJMoa2206286



Empagliflozin in Heart Failure with a Preserved Ejection Fraction





Anker SD et al. DOI: 10.1056/NEJMoa2107038

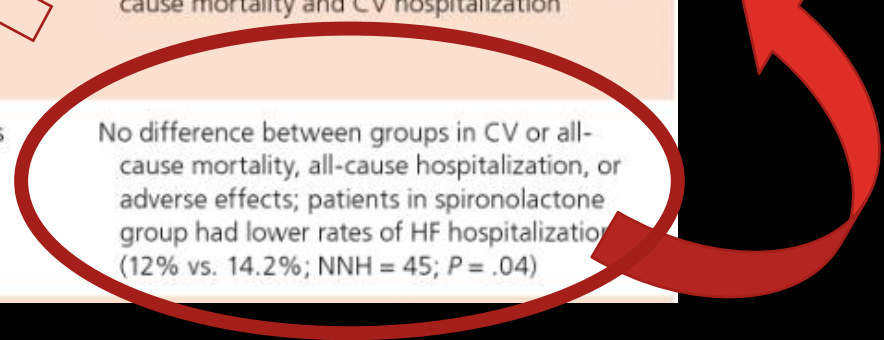


Empagliflozin DID NOT SIGNIFICANTLY REDUCE the INCIDENCE OF CV DEATH alone

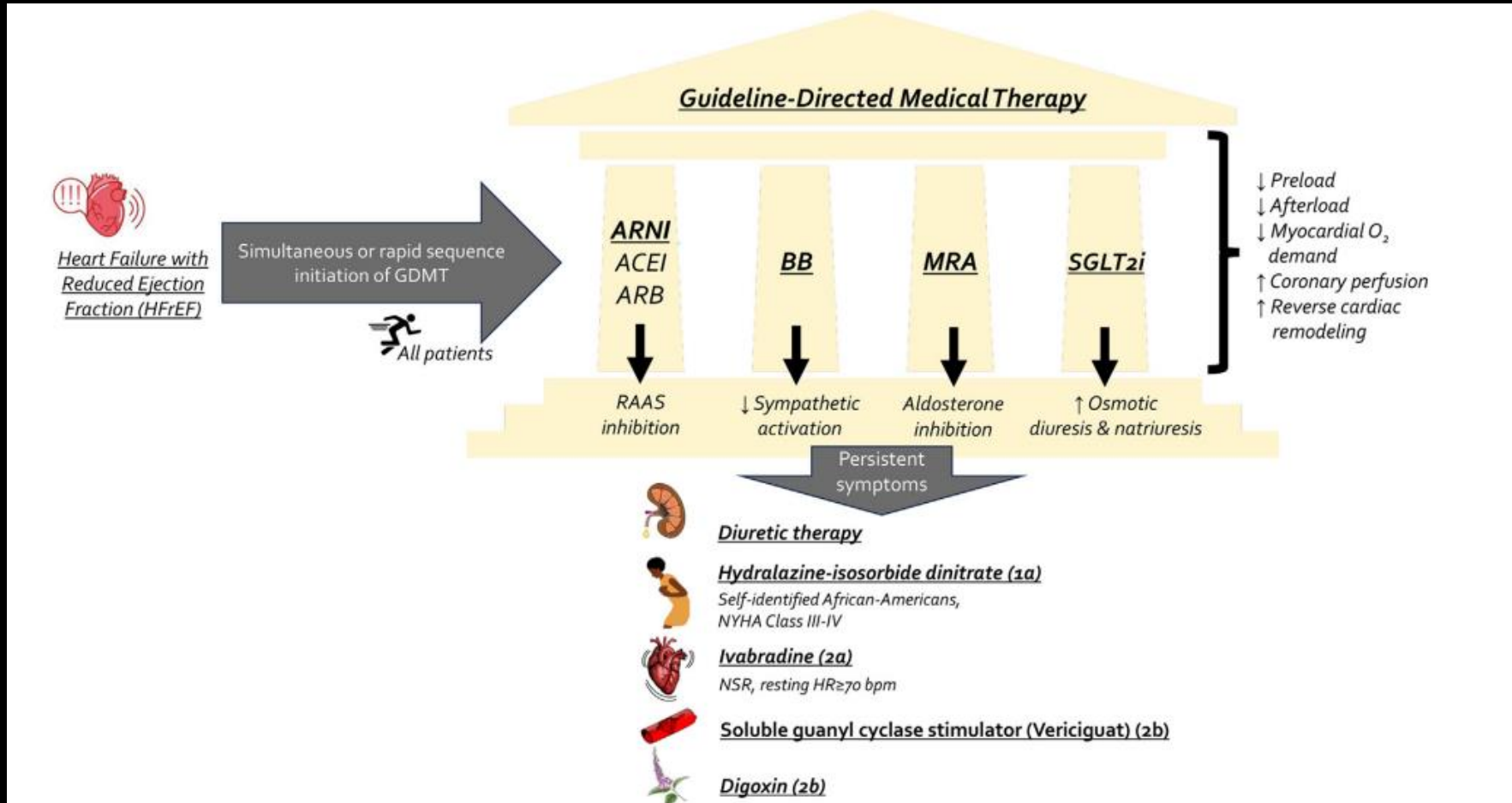
eTable A. Randomized Controlled Trials of Medications for Treatment of Heart Failure with Preserved Ejection Fraction

<i>Trial</i>	<i>Comparison</i>	<i>Population</i>	<i>Duration</i>	<i>Results</i>
Aldosterone Receptor Blockade in Diastolic Heart Failure (Aldo-DHF) trial ^{A1}	Spironolactone vs. placebo	422 patients with symptomatic HF and LVEF ≥ 50%	12 months	No difference between groups in Minnesota Living with Heart Failure Questionnaire scores; patients taking spironolactone had lower six-minute walk distance (517 vs. 536 meters; <i>P</i> = .02)
Candesartan in Heart Failure—Assessment of Reduction in Mortality and Morbidity—Preserved (CHARM-Preserved) trial ^{A2}	Candesartan (Atacand) vs. placebo	3,023 patients with NYHA class II to IV HF, LVEF > 40%, and prior hospital admission for cardiac reason	36 months	No difference between groups in CV mortality; CV, HF, or all-cause hospitalization; withdrawal due to adverse events was greater in the candesartan group (17.8% vs. 13.5%; NNH = 24; <i>P</i> = .001)
Digitalis Investigation Group (DIG) ancillary trial ^{A3}	Digoxin vs. placebo	988 patients with LVEF > 45% and normal sinus rhythm	37 months	No difference between groups in HF hospitalizations or HF or CV mortality
Digitalis Investigation Group (DIG) ancillary trial (post hoc analysis) ^{A4}	Digoxin vs. placebo	631 patients 65 years and older with LVEF > 45% and normal sinus rhythm	37 months	Patients in digoxin group were more likely to be hospitalized (9% vs. 3.8%; NNH = 20 <i>P</i> = .026)
Irbesartan in Patients with Heart Failure and Preserved Ejection Fraction (I-PRESERVE) trial ^{A5}	Irbesartan (Avapro) vs. placebo	4,128 patients with NYHA class II to IV HF, LVEF > 45%, and HF hospitalization in previous six months	49.5 months	No difference between groups in CV or all-cause mortality; CV, HF, or all-cause hospitalization; or withdrawal due to adverse effects
Japanese Diastolic Heart Failure Study (J-DHF) ^{A6}	Carvedilol (Coreg) vs. placebo	245 patients with HF and EF > 40%	3.2 years	No difference between groups in CV or all-cause mortality or HF hospitalization
Nitrate's Effect on Activity Tolerance in Heart Failure with Preserved Ejection Fraction (NEAT-HFpEF) trial ^{A7}	Crossover trial of isosorbide mononitrate vs. placebo	220 ambulatory patients 50 years and older with HF and LVEF ≥ 50%	Two six-week crossover periods	Patients in isosorbide mononitrate group had lower activity levels as measured by an accelerometer (9,185 vs. 9,623 accelerometer units; <i>P</i> = .02) and less daily activity (9.01 vs. 9.31 hours; <i>P</i> = .002)

Perindopril in Elderly People with Chronic Heart Failure (PEP-CHF) trial ^{A8}	Perindopril (Aceon) vs. placebo	850 patients 70 years and older taking diuretics for clinical HF diagnosis with CV hospitalization in previous six months and LVEF 40% to 50%	2.1 years 	No difference between groups in all-cause mortality or combined all-cause mortality and unplanned HF hospitalization
Phosphodiesterase-5 Inhibition to Improve Clinical Status and Exercise Capacity in Diastolic Heart Failure (RELAX) trial ^{A9}	Sildenafil (Revatio) vs. placebo	216 patients with symptomatic HF and LVEF ≥ 50%	12 weeks 	No difference between groups in change in peak oxygen consumption, clinical rank score, exercise capacity, six-minute walk distance, or adverse effects
Study of Effects of Nebivolol Intervention on Outcomes and Rehospitalization in Seniors with Heart Failure (SENIORS) trial ^{A10}	Nebivolol (Bystolic) vs. placebo	2,128 patients 70 years and older with clinical diagnosis of HF (hospital admission for HF in previous 12 months or known LVEF ≤ 35%), including patients with HF with preserved or reduced EF	21 months 	No difference between groups in all-cause hospitalization or mortality; fewer patients in the nebivolol group had the combined outcome of all-cause mortality and CV hospitalization (31.1% vs. 35.3%; NNT = 24; P = .039)
Study of Effects of Nebivolol Intervention on Outcomes and Rehospitalization in Seniors with Heart Failure (SENIORS) trial (post hoc analysis) ^{A11}	Nebivolol vs. placebo	752 patients with clinical HF (hospital admission for HF in previous 12 months) and LVEF > 35% (mean EF of 49%)	21 months 	No difference between groups in all-cause hospitalization or mortality, or combined all-cause mortality and CV hospitalization
Treatment of Preserved Cardiac Function Heart Failure with an Aldosterone Antagonist (TOPCAT) trial ^{A12}	Spirolactone vs. placebo	3,446 patients with HF symptoms, LVEF ≥ 45%, and hospitalization in previous 12 months	3.3 years	No difference between groups in CV or all-cause mortality, all-cause hospitalization, or adverse effects; patients in spironolactone group had lower rates of HF hospitalization (12% vs. 14.2%; NNH = 45; P = .04)



HFREF 4 PILLARS

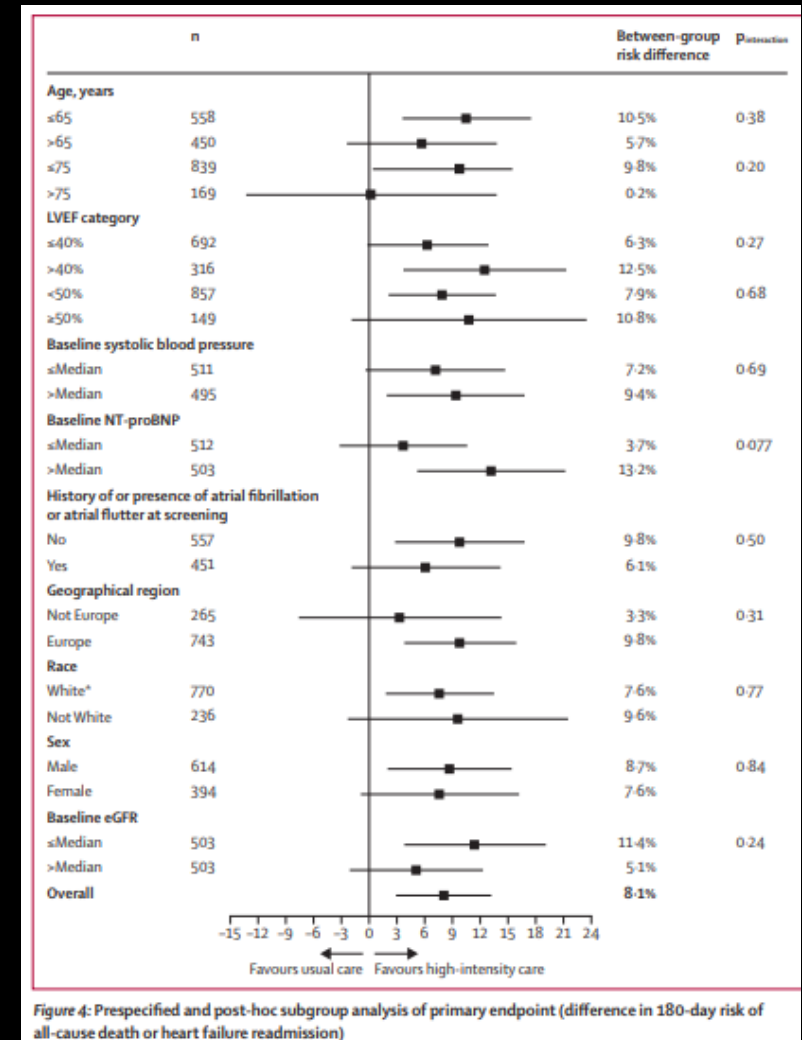


Safety, tolerability, and efficacy of up-titration of guideline-directed medical therapies for acute heart failure (STRONG-HF): a multinational, open-label, randomised, trial

Alexandre Mebazaa, Beth Davison, Ovidiu Chioncel, Alain Cohen-Solal, Rafael Diaz, Gerasimos Filippatos, Marco Metra, Piotr Ponikowski, Karen Sliwa, Adriaan A Voors, Christopher Edwards, Maria Novosadova, Koji Takagi, Albertino Damasceno, Hadiza Saidu, Etienne Gayat, Peter S Pang, Jelena Celutkiene, Gad Cotter

- Comparison of high intensity treatment vs usual care (local policy)
- Guideline directed treatment
- Acute HF patients
- 18-85
- 87 Hospitals, 14 countries, 1078
- Uptitration of treatment to 100% <2/52 of discharge
- Primary End Point - 180-day readmission to hospital due to heart failure or all-cause death.
- Stopped early due to differences between groups
- By day 90, BP, HR, NYHA, Weight had decreased more in the high-intensity care group than in the usual care group
- HF readmission or all-cause death up to day 180 occurred in 74/506 high-intensity care group VS 109/502 usual care group.

STRONG HF

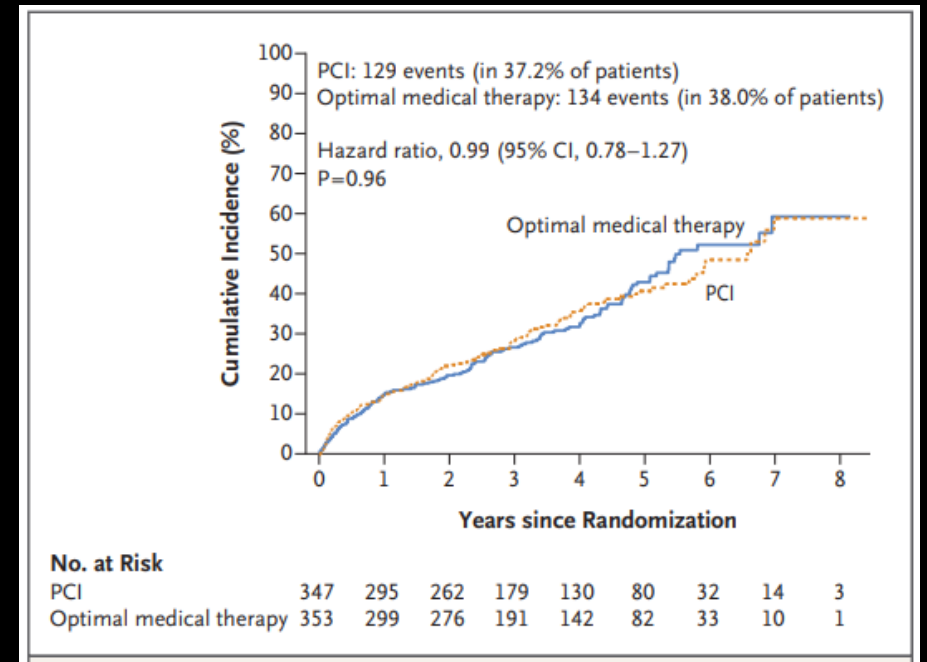


Percutaneous Revascularization for Ischemic Left Ventricular
Dysfunction

Divaka Perera, M.D., Tim Clayton, M.Sc., Peter D. O’Kane, M.D., John P. Greenwood, Ph.D.,
Roshan Weerackody, Ph.D., Matthew Ryan, Ph.D., Holly P. Morgan, M.B., B.Ch., Matthew Dodd, M.Sc.,
Richard Evans, B.A., Ruth Canter, M.Sc., Sophie Arnold, M.Sc., Lana J. Dixon, Ph.D., Richard J. Edwards, Ph.D.,
Kalpa De Silva, Ph.D., James C. Spratt, M.D., Dwayne Conway, M.D., James Cotton, M.D.,
Margaret McEntegart, Ph.D., Amedeo Chiribiri, Ph.D., Pedro Saramago, Ph.D., Anthony Gershlick, M.D.,
Ajay M. Shah, M.D., Andrew L. Clark, M.D., and Mark C. Petrie, M.D., for the REVIVED-BCIS2 Investigators*

REVIVED BCIS II

- 700 patients
- Severe Ischaemic Cardiomyopathy (EF <35%)
- Stable CAD (Not ACS) with viable myocardium
- OMT Vs PCI
- Revascularization by PCI **did not result** in a lower incidence of death from any cause or hospitalization for heart failure





TIP 5:

CONSIDER EARLY ECHO FOR AT RISK
PATIENTS WITH FEVER

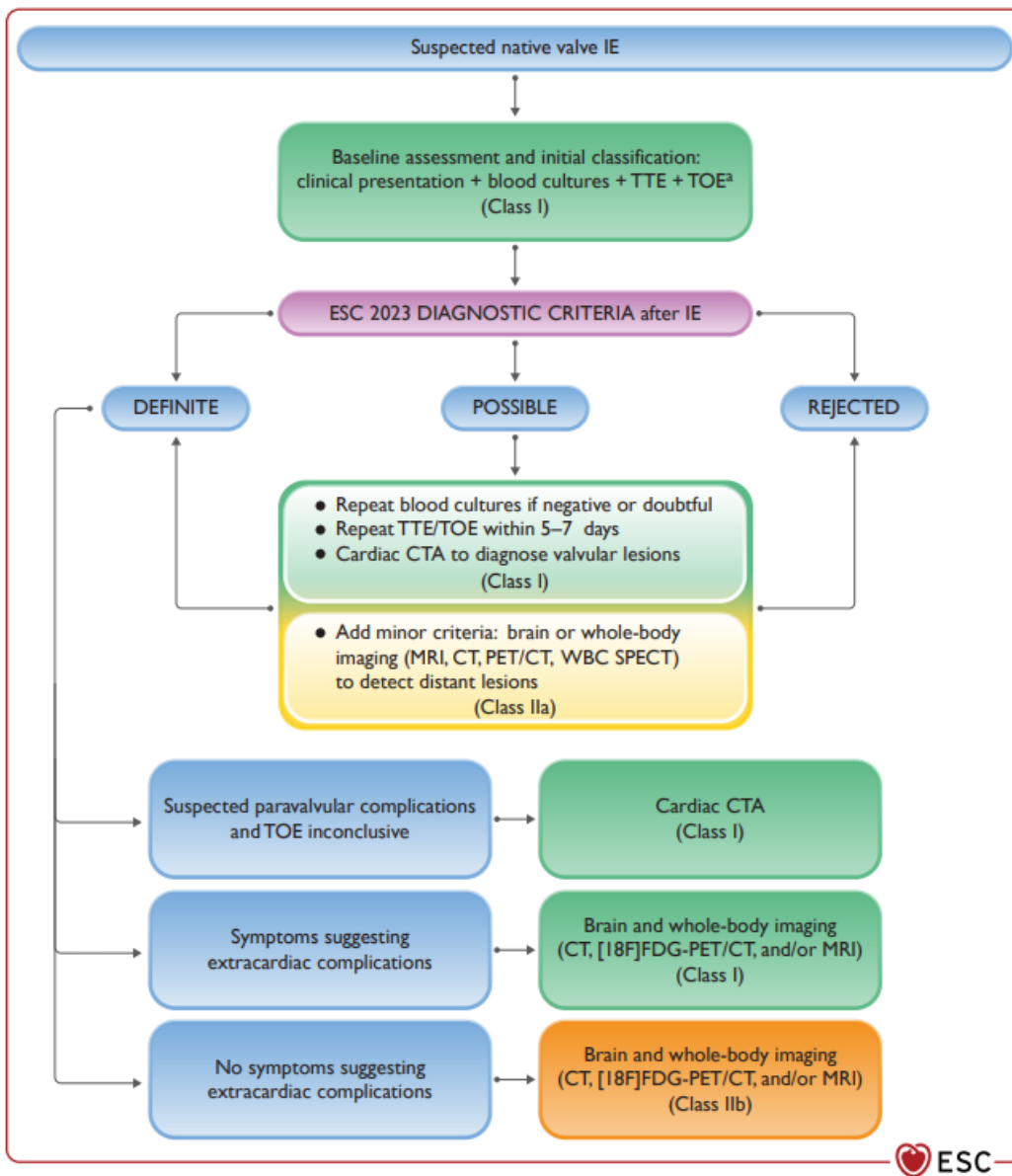
INFECTIVE ENDOCARDITIS

- Difficult!
- Presents in a heterogeneous way
- Embolic phenomena – renal, splenic, stroke, vascular
- More patients with devices, valves and therefore IE cases will rise
- Dental access is poor
- Consider early Echo in anyone with Fever + Murmur / Fever + high risk
- Low index of suspicion in high risk patients

All else

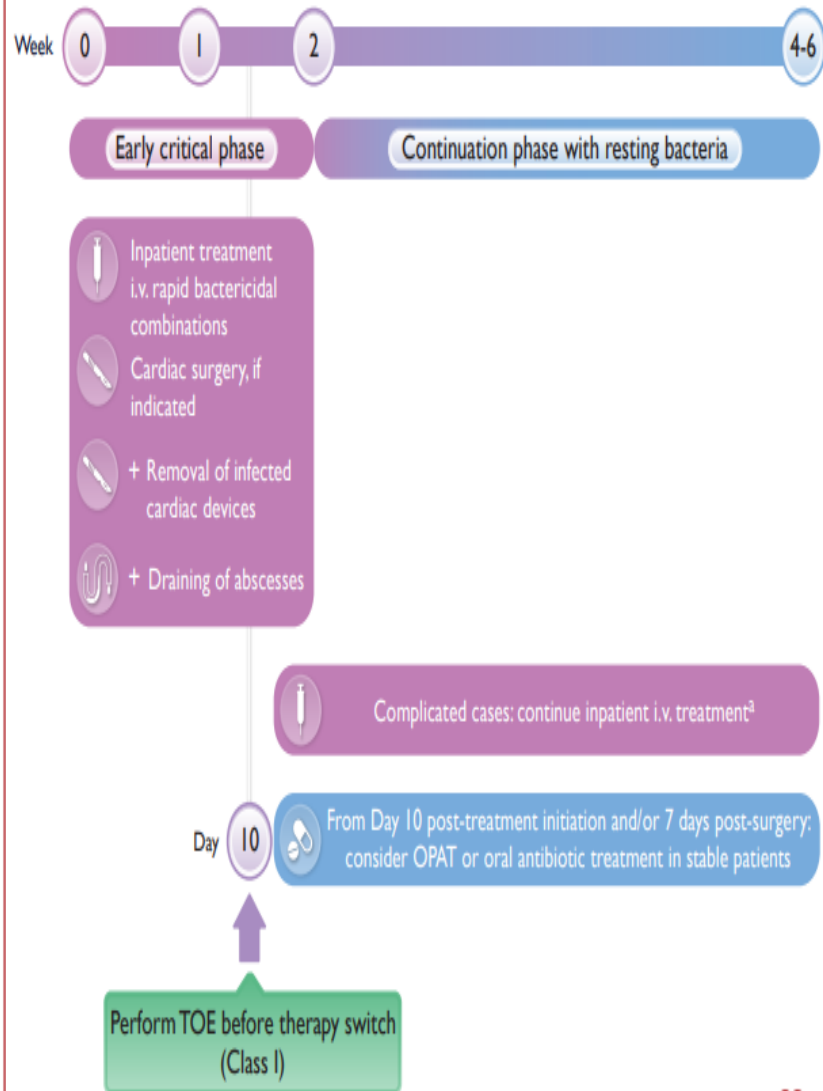
RhHD,
Degenerative valve disease,
Congenital valve abn (BAV),
CIEDs, HCM, VADs

Prev IE, Prosthetic Valves (B>M), TAVI, MV
Repair, Septal closure device (<6/12),
CHD (untreated cyanotic, prosthetic
material)



- Other imaging modalities available
- We utilise CT/PET to assist decision making especially in PVE cases
- If high index of suspicion but negative imaging – repeat @ 5-7 days
- BC!BC!BC!

Phases of antibiotic treatment of infective endocarditis



EARLY DISCHARGE ON ORAL ABX

POET TRIAL

- Randomized, noninferiority, multicenter trial
- 400 patients
- IV antibiotics Vs Oral switch at 2 weeks
- Streptococcus, Enterococcus faecalis, Staphylococcus aureus, or coagulase-negative staphylococci

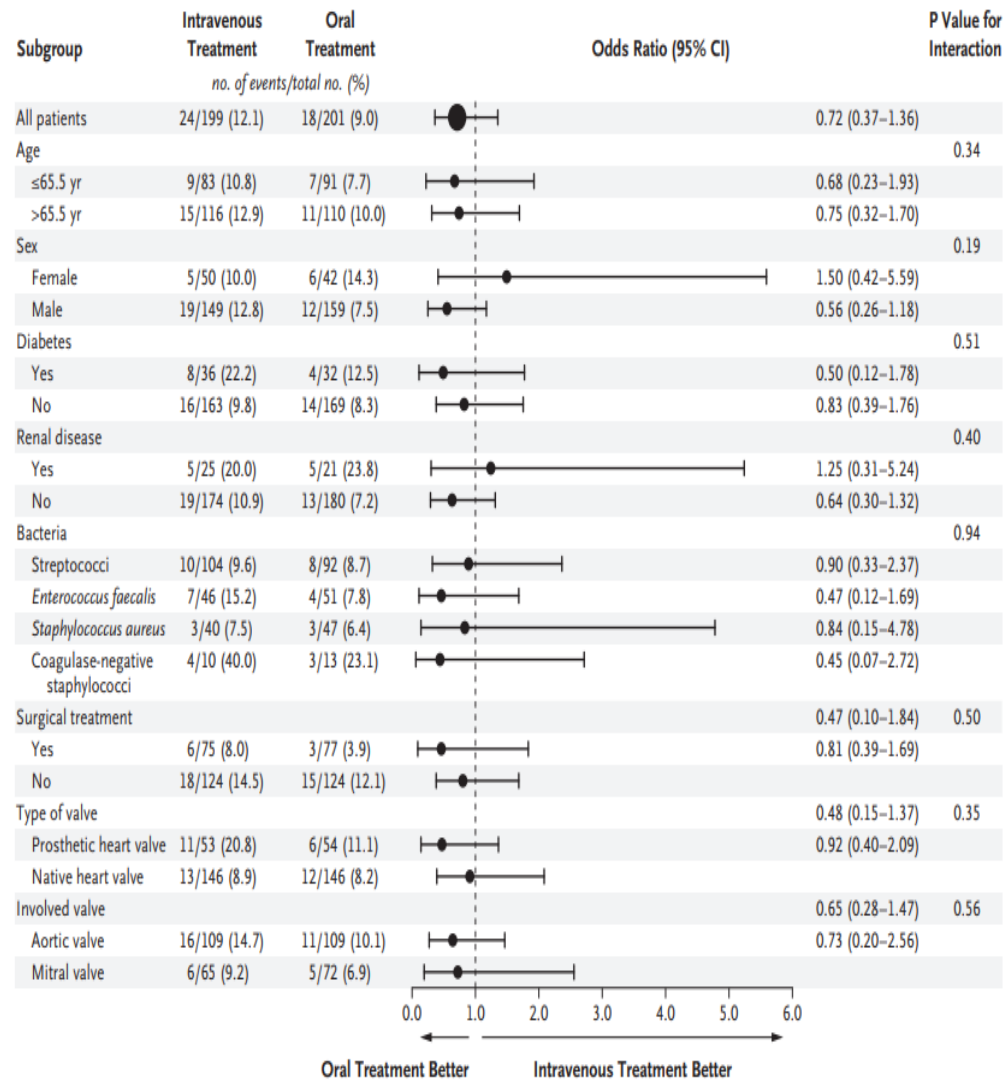
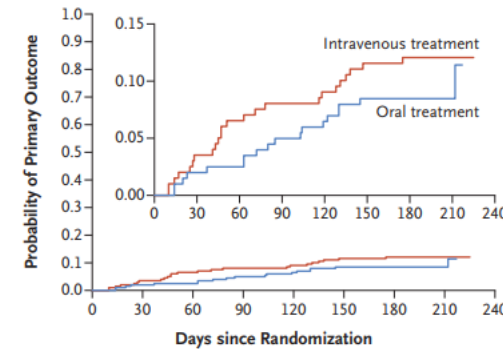


Figure 3. Rates of the Primary Outcome in Prespecified Subgroups.

Partial Oral versus Intravenous Antibiotic Treatment of Endocarditis

Kasper Iversen, M.D., D.M.Sc., Nikolaj Ihlemann, M.D., Ph.D., Sabine U. Gill, M.D., Ph.D., Trine Madsen, M.D., Ph.D., Hanne Elmring, M.D., Ph.D., Kaare T. Jensen, M.D., Ph.D., Niels E. Bruun, M.D., D.M.Sc., Dan E. Høfsten, M.D., Ph.D., Kurt Førsted, M.D., D.M.Sc., Jens J. Christensen, M.D., D.M.Sc., Martin Schultz, M.D., Christine F. Klein, M.D., Emil L. Fosbøl, M.D., Ph.D., Flemming Rossenings, M.D., Henrik C. Schønheyder, M.D., D.M.Sc., Lars Køber, M.D., D.M.Sc., Christian Torp-Pedersen, M.D., D.M.Sc., Jannik Helweg-Larsen, M.D., D.M.Sc., Niels Tønder, M.D., D.M.Sc., Claus Moser, M.D., Ph.D., and Henning Bundgaard, M.D., D.M.Sc.



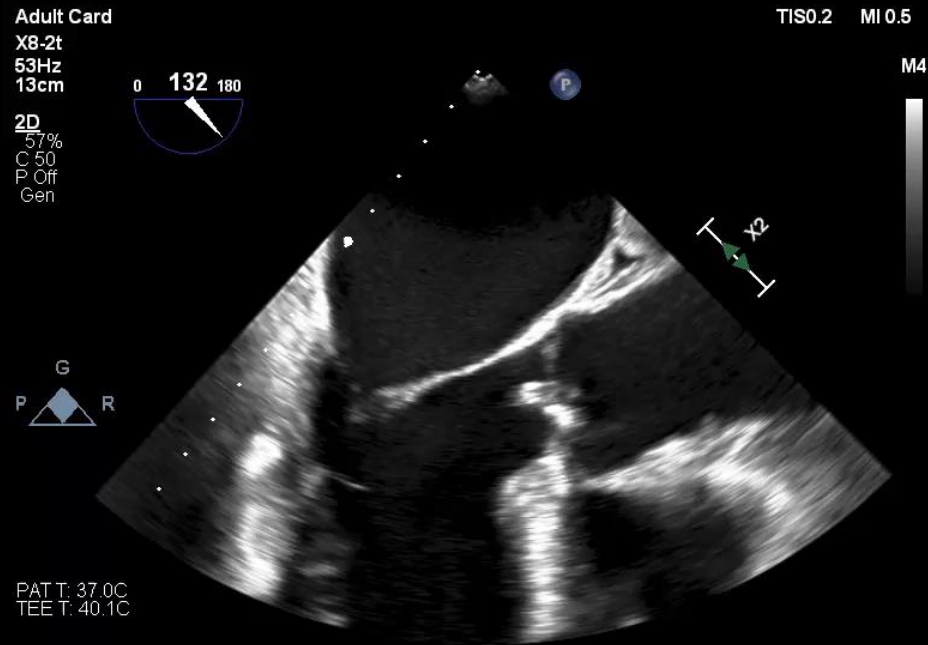
No. at Risk	0	30	60	90	120	150	180	210	240
Intravenous treatment	199	192	186	183	181	176	174	28	0
Oral treatment	201	197	196	191	188	184	183	36	0

Figure 2. Kaplan–Meier Plot of the Probability of the Primary Composite Outcome.

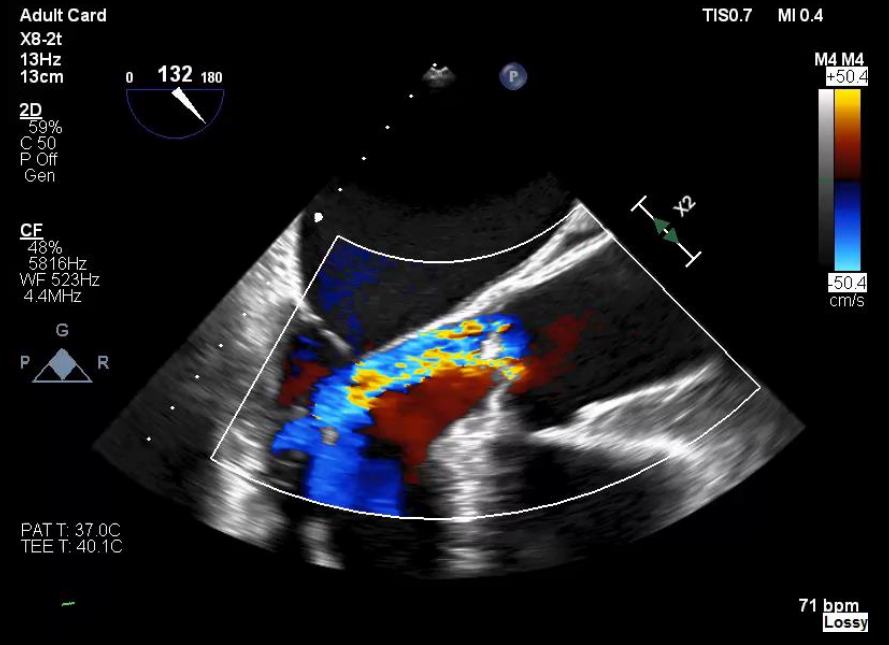
The primary composite outcome was all-cause mortality, unplanned cardiac surgery, embolic events, or relapse of bacteremia with the primary pathogen, from randomization until 6 months after antibiotic treatment was completed. The oral treatment group shifted from intravenously administered antibiotics to orally administered antibiotics at a median of 17 days after the start of treatment. The inset shows the same data on an enlarged y axis.

Changing to oral antibiotic treatment was noninferior to continued intravenous antibiotic treatment.

AV ENDOCARDITIS



73 bpm
Lossy



71 bpm
Lossy

MV ENDOCARDITIS

Adult Echo
X8-2t
53Hz
12cm

2D
53%
C 50
P Off
Gen



TIS0.2 MI 0.5

M4

Adult Echo
X8-2t
28Hz
9.1cm

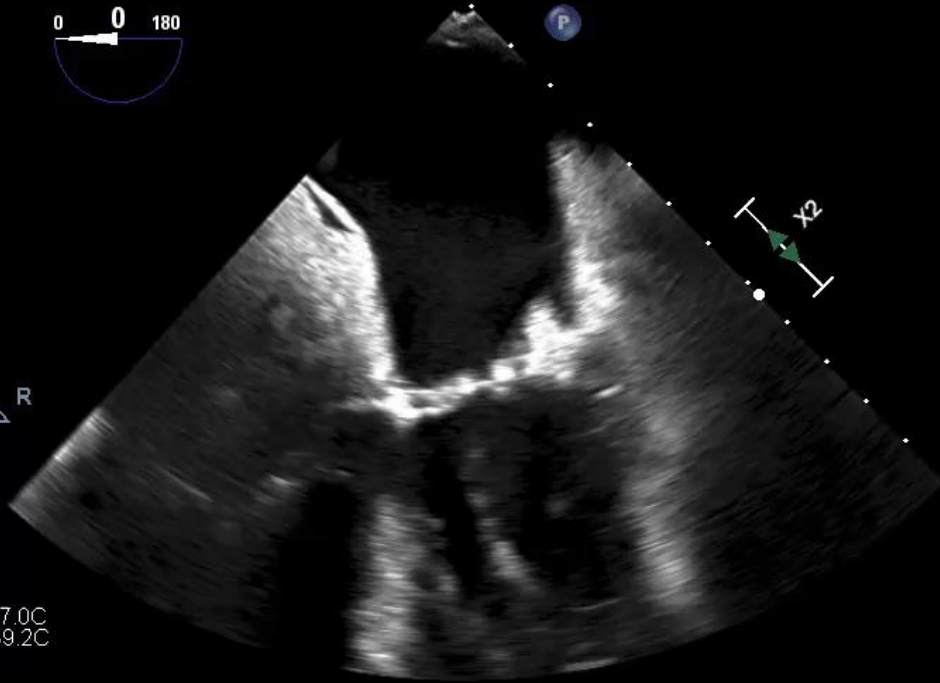
3D Beats 1

3D Zoom
2D / 3D
% 55 / 45
C 50 / 30
Gen
XRES ON

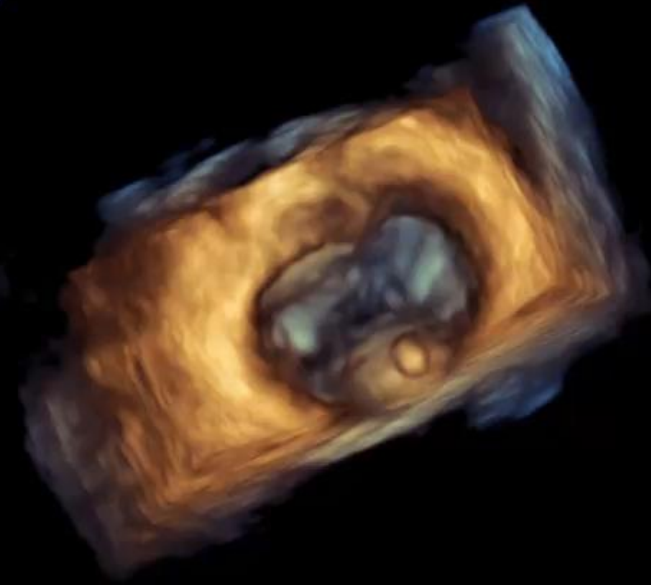


TIS0.2 MI 0.2

G
P R



PAT T: 37.0C
TEE T: 39.2C

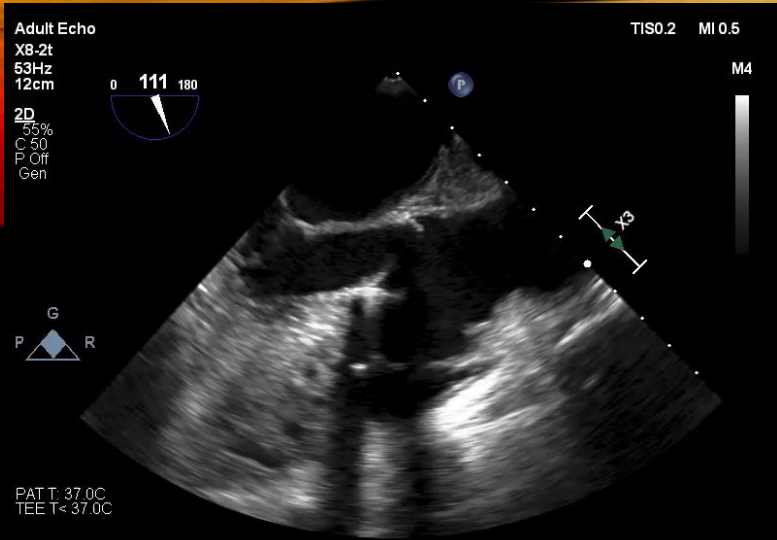


PAT T: 37.0C
TEE T: 40.6C

75 bpm
Lossy

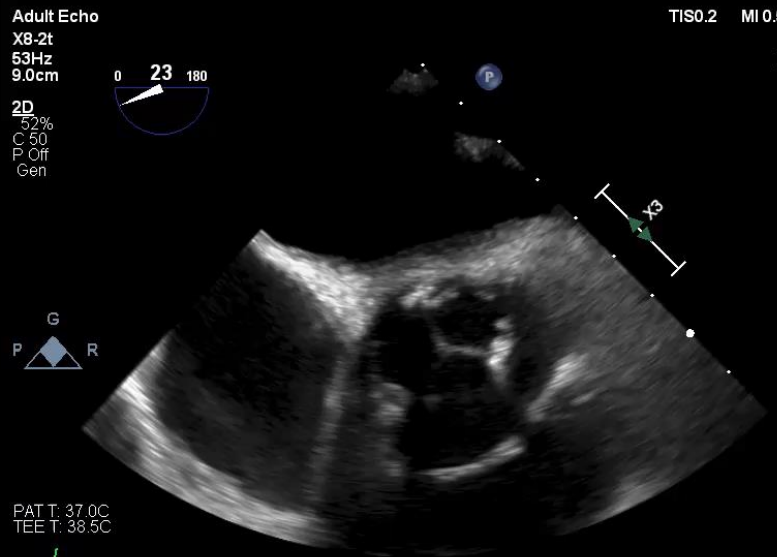
70 bpm
Lossy

PROSTHETIC AV VALVE PSEUDOANEURYSM



PAT T: 37.0C
TEE T: 37.0C

132 bpm
Lossy



PAT T: 37.0C
TEE T: 38.5C

114 bpm
Lossy

Adult Echo
X8-2t
19Hz
9.0cm

2D
54%
C 50
P Off
Gen

CF
48%
6838Hz
WF 6.15Hz
4.4MHz



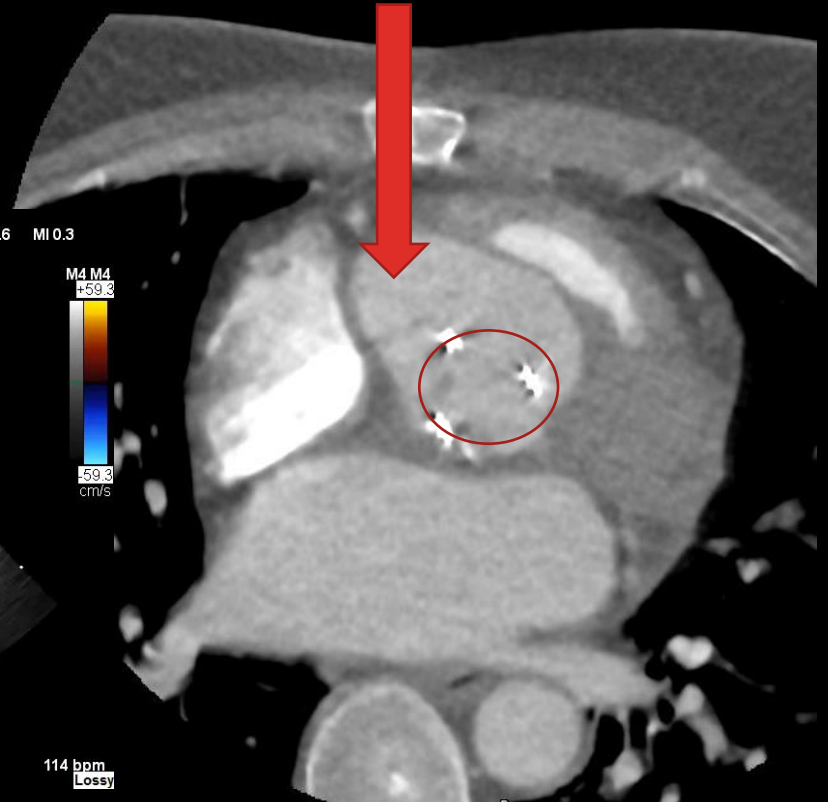
PAT T: 37.0C
TEE T: 38.6C

2024-12-04

TIS0.6 MI 0.3

M4 M4
59.3
59.3
cm/s

114 bpm
Lossy





TIP 7:
LETS NOT FORGET ABOUT AF

WHATS NEW IN AF

- Doubling of AF 2010-2060
- Lifetimes risk 1:5 -> 1:3
- Symptom classification
- AF – CARE more patient centred approach
- Rhythm control is important in selected patients
 - particularly those with reduced EF

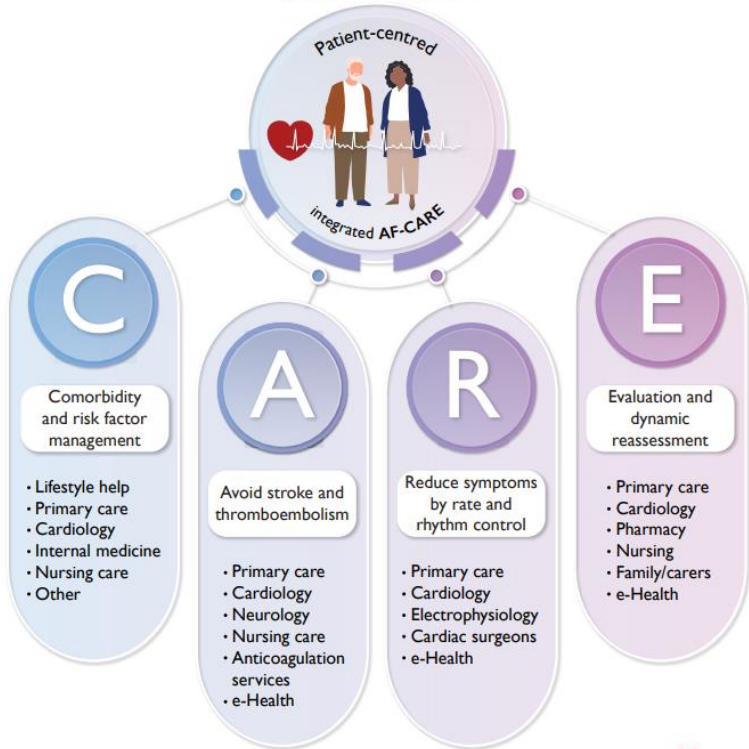
Table 7 The modified European Heart Rhythm Association (mEHRA) symptom classification

Score	Symptoms	Description
1	None	AF does not cause any symptoms
2a	Mild	Normal daily activity not affected by symptoms related to AF
2b	Moderate	Normal daily activity not affected by symptoms related to AF, but patient troubled by symptoms
3	Severe	Normal daily activity affected by symptoms related to AF
4	Disabling	Normal daily activity discontinued

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Atrial fibrillation



Comorbidity and risk factor management

Hypertension Blood pressure lowering treatment (Class I)	Heart failure Diuretics for congestion (Class I) Appropriate HFrEF medical therapy (Class I) SGLT2 inhibitors (Class I)	Overweight or obese Weight loss (target 10%) ^a (Class I) Bariatric surgery if rhythm control ^a (Class IIb)	Obstructive sleep apnoea Management of OSA ^a (Class IIb)	Alcohol Reduce to ≤3 drinks per week (Class I)
Diabetes mellitus Effective glycaemic control ^a (Class I)			Exercise capacity Tailored exercise programme (Class I)	Other risk factors/comorbidities Identify and manage aggressively ^a (Class I)

Identify risk factors and optimise them
SGLT2 can be used in HF and AF

R Reduce symptoms by rate and rhythm control

See patient pathways for:

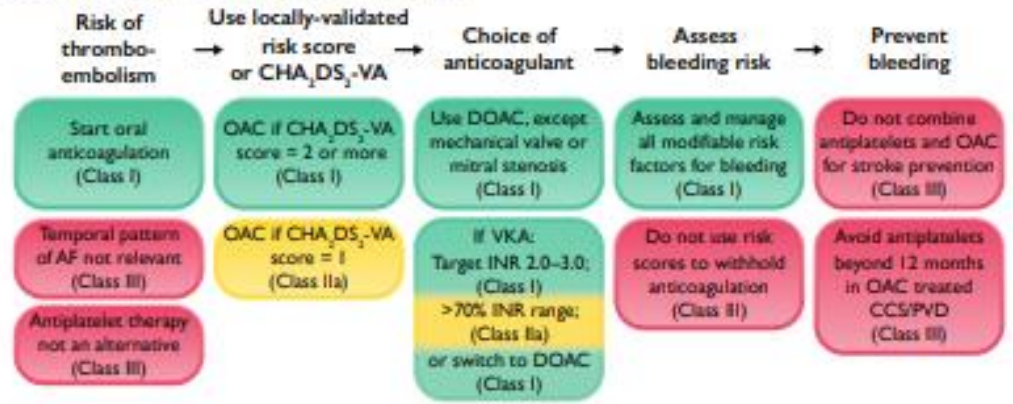
First-diagnosed AF Paroxysmal AF Persistent AF Permanent AF

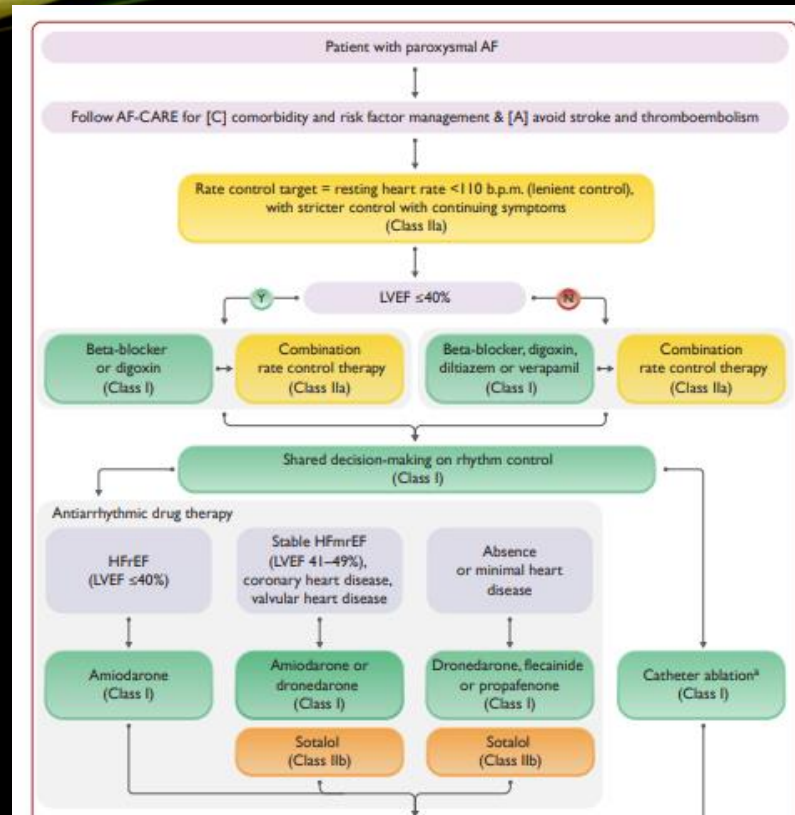
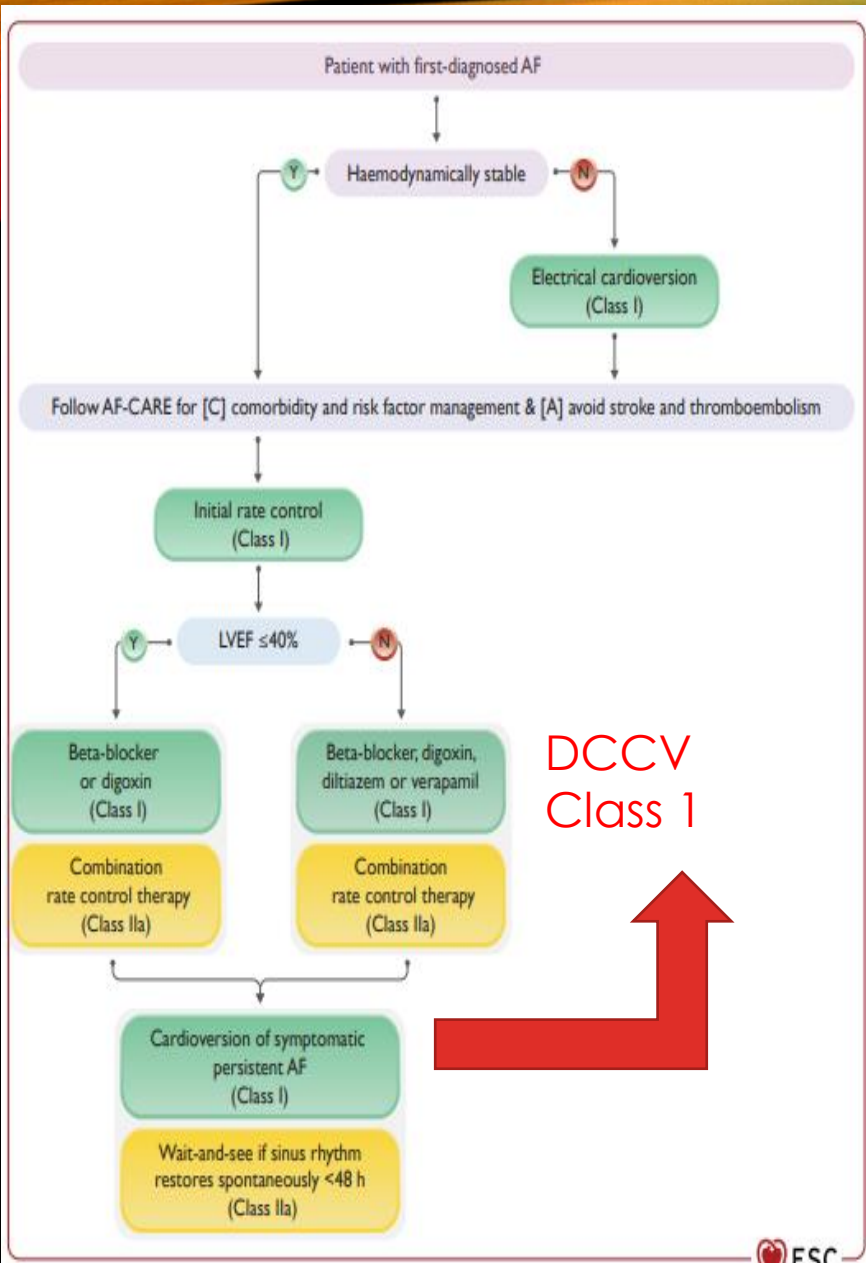
Consider:

Rate control drugs Cardioversion Antiarrhythmic drugs Catheter ablation Endoscopic/hybrid ablation Surgical ablation Ablate and pace



Avoid stroke and thromboembolism





CASTLE-AF trial (Catheter Ablation versus Standard Conventional Treatment in Patients With Left Ventricle Dysfunction and AF) = rhythm control strategy with catheter ablation can improve mortality and morbidity in selected patients with HFrEF and an implanted cardiac device

Try harder to rhythm control the more reduced the LV is.

SR maintenance should be pursued to reduce morbidity and mortality in selected groups of patients

CLINICAL SKILLS VS TESTS

- Every medical contact maybe the first detection of CV disease
- The stethoscope is still in vogue - Don't miss that murmur !
- Utilise NTproBNP/ BNP and Echo
- Give as much information on the Echo/Holter/ETT request form as possible
- Compare ECGs to previous
- Be aware of outliers – women, younger adults
- No tests will ever substitute clinical acumen

NEW THINGS ON THE HORIZON

- AI – is increasingly playing a role in diagnostics
- Lipids – injectables above atorvastatin
- We are finally recognising our role in primary prevention
- Cardiometabolic clinics
- Structural – Mitraclip, Triclip
- Decision making for life
- Have we come full circle ?

JUST REMEMBER

- Every patient of yours has a heart !
- If you think they have a cardiac issue – they probably do !
- If you are struggling – we probably will too so ASK
- If we don't perform enough normal coronary angiograms then we are missing patients with ACS
- We MDT a lot of our patients – because like echocardiography everything is grey
- Familiarise yourself of the referral processes into cardiology acute services and OP services (rapid access CP clinic, rapid diagnostic clinic)
- Find yourself a friendly cardiologist (sometimes found down the local)

THANK YOU

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