Cardiology in the Elderly

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Disclosures

- I have no actual or potential conflicts of interest in relation to this program or presentation to disclose.

- I prepared this lecture in my personal capacity. The opinions expressed in this lecture are my own and do not reflect the view of the Veteran's Health Administration or the United States government.

Topics

1. Heart Failure
2. Acute Coronary Syndrome
3. Atrial fibrillation
4. Some Clinical Pearls (time permitting)

HF: Case 1

- 75 y/o woman recently admitted with new HF symptoms now presenting in clinic. She complains of intermittent lightheadedness with postural changes (no syncope). Denies orthopnea & PND. She is dyspneic with >1 flight of stairs or walking briskly, however, carries out her ADLs without much difficulty (NYHA II).
- PMHx notable for hypertension, atrial fibrillation (CHADS2-Vasc = 6), diabetes mellitus (type II), chronic kidney disease stage 3 (baseline Cr 1.2, EGFR 45-50), and with previously treatment for HER2+ breast cancer with trastuzumab, pertuzumab, and paclitaxel which is in remission for the past year.
- During admission she underwent echo which demonstrated normal LV size, mild LVH, LVEF 40% and mild aortic stenosis. Pharm MPS negative. No recent ECG is available for review???
- She is currently on losartan 12.5 mg daily, empagliflozin 12.5 mg daily, spironolactone 12.5 mg daily, furosemide 40 mg twice daily, and apixaban 5 mg BID. ARB, MRA, & loop diuretic are new medications (her CCB for HTN was discontinued and her Bblkr for AF was not resumed)
- Vitals: BP 106/66 mmHg, HR 76 bpm. Weight stable.
- Exam: NAD, Irregularly irregular heart rate, 3/6 systolic murmur, JVD 8 cm w/ +HJR. Lungs CTAB. No LEE. WWP.
- You are seeing her 1 week after discharge.

HF Case 1:

- Etiology of her HF?
  - AF? HTN? Chemo?
- Labs to order?
  - Chm7 & CBC
- Additional testing?
  - ECG & CXR
- Would you start a beta-blocker?
  - Yes (low dose, slow titration)

HF: Scope of the problem

- Prevalence of HF
  - 60-79 y/o
    - Women: 4%
    - Men: 7%
  - >80 y/o
    - Women: 11%
    - Men: 10%

HF: Trends in 30 day, 1-year, and 5-year mortality by sex and age

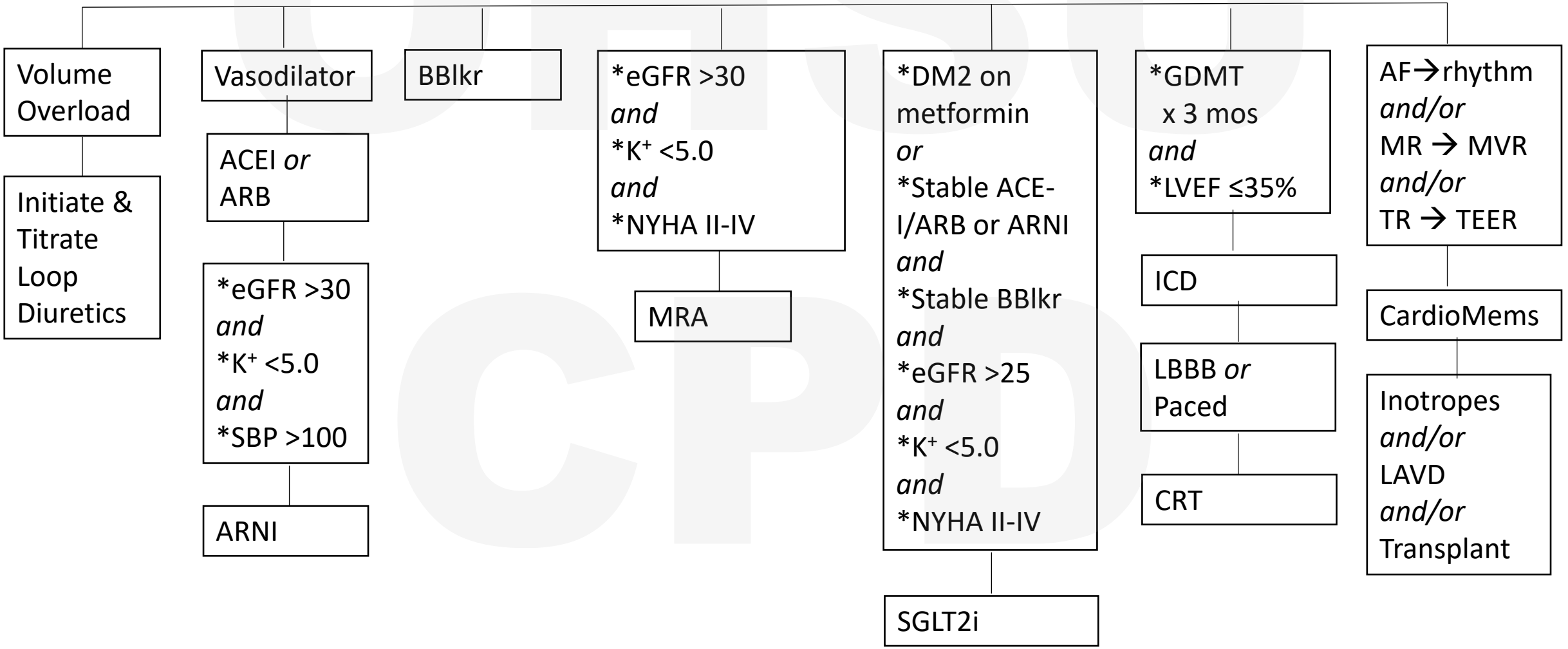
Women

Age Group	30-day	1-year	5-years
24-54	3.8	10.5	20.4
55-64	5.8	16.0	35.4
65-74	**8.1**	**21.1**	**52.9**
75-84	12.6	30.2	64.9
85+	20.1	46.1	85.3

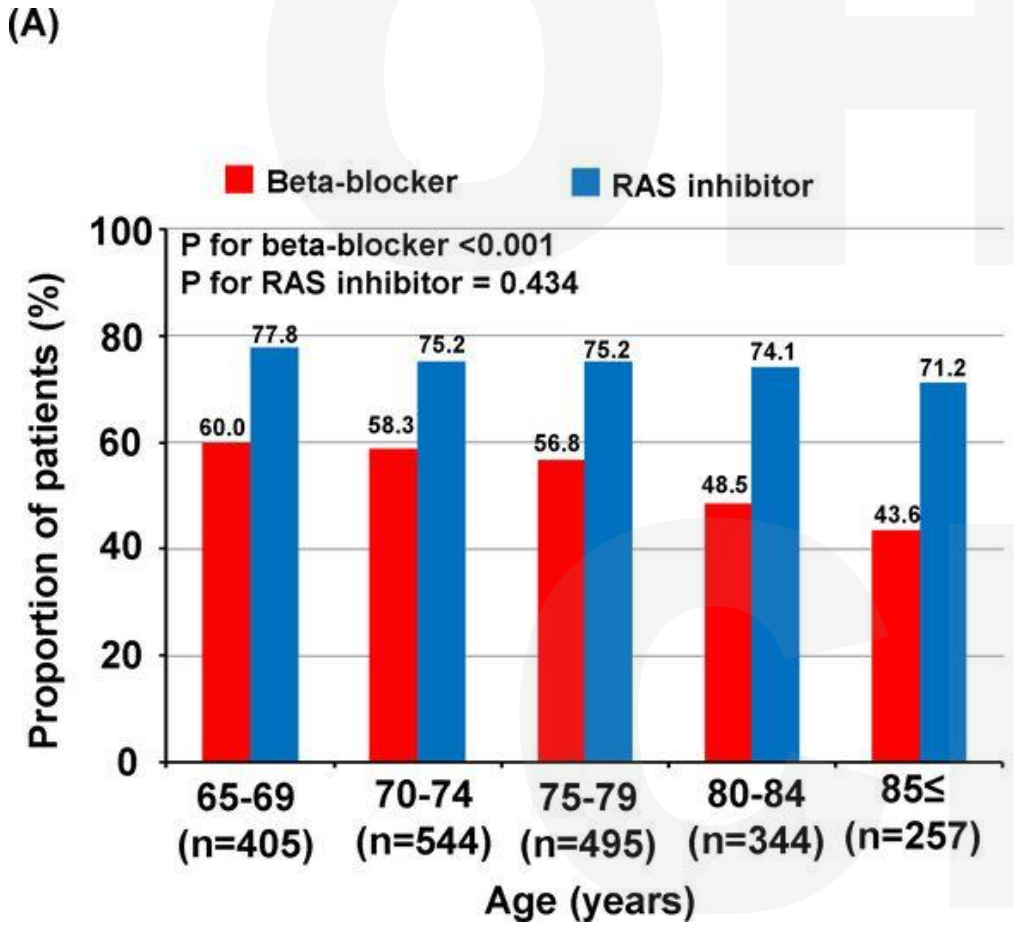
Men

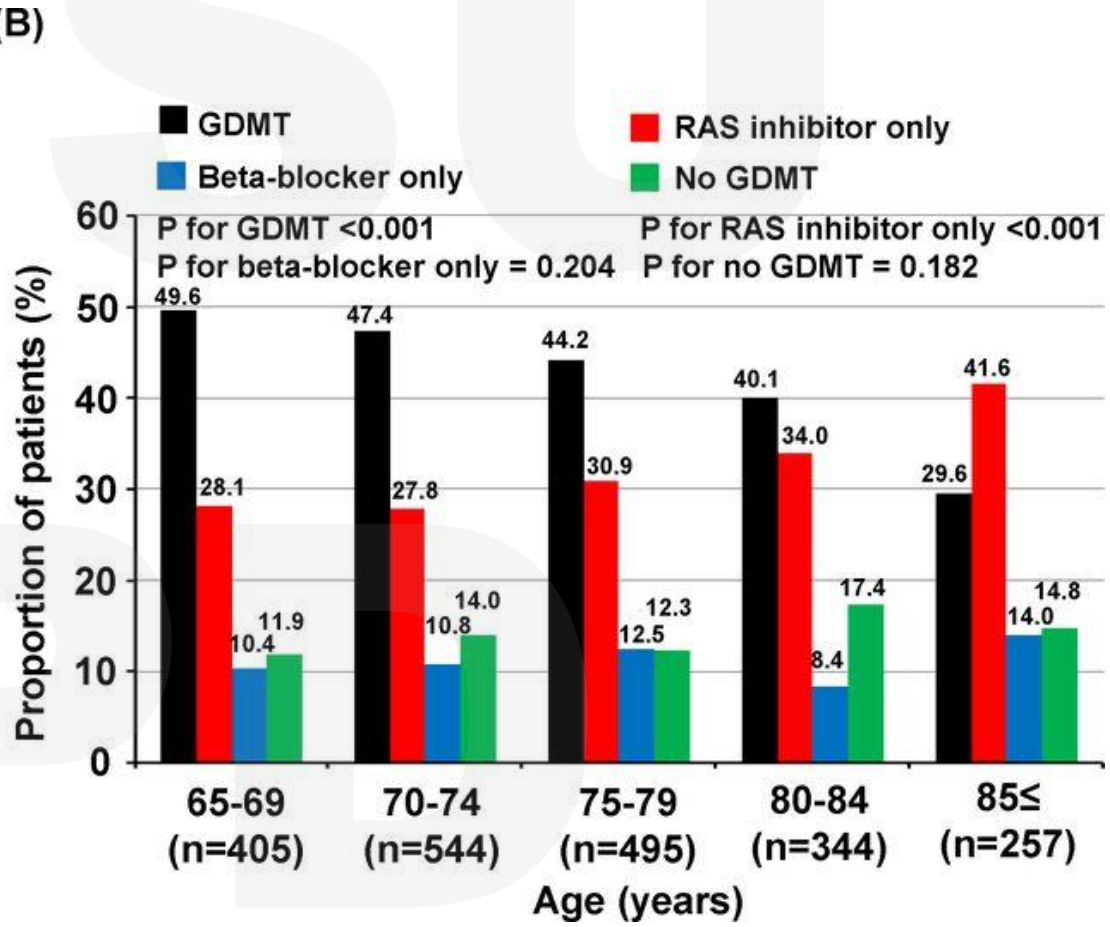
Age Group	30-day	1-year	5-years
24-54	3.9	9.8	22.1
55-64	4.8	14.3	34.5
65-74	**8.0**	**22.6**	**52.9**
75-84	14.2	36.3	73.4
85+	25.2	53.4	89.5

HF: GDMT


Volume Overload
Initiate & Titrate Loop Diuretics
Vasodilator
ACEI *or* ARB
*eGFR >30 *and* *K^+ <5.0 *and* *SBP >100
ARNI
BBlkr
*eGFR >30 *and* *K^+ <5.0 *and* *NYHA II-IV
MRA
*DM2 on metformin *or* *Stable ACE-I/ARB or ARNI *and* *Stable BBlkr *and* *eGFR >25 *and* *K^+ <5.0 *and* *NYHA II-IV
SGLT2i
*GDMT x 3 mos *and* *LVEF ≤35%
ICD
LBBB *or* Paced
CRT
AF→rhythm *and/or* MR → MVR *and/or* TR → TEER
CardioMems
Inotropes *and/or* LAVD *and/or* Transplant

HF: Use of GDMT (Bblkr + ACEi/ARB)

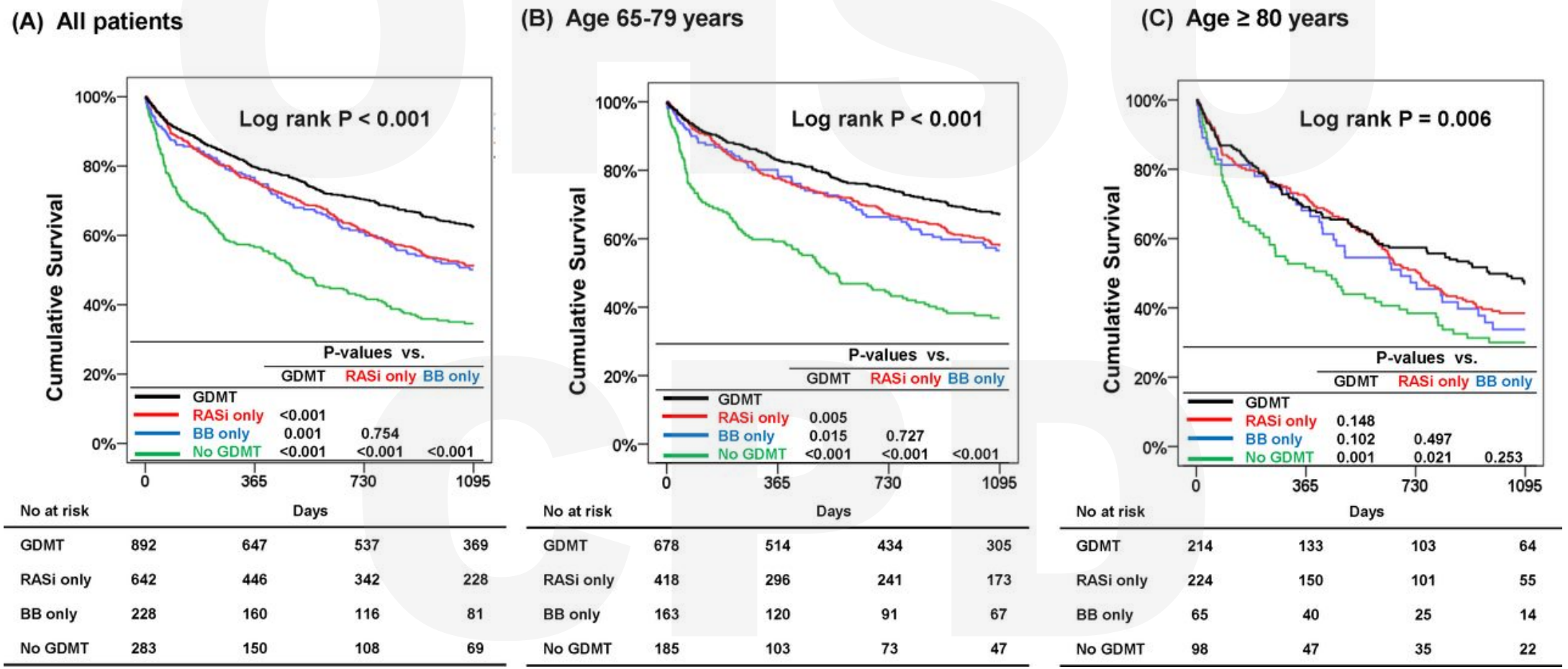




Am Heart J. 2004. doi: 10.1016/j.ahj.2004.06.001
Eur Heart J. 2008. doi:10.1093/eurheartj/ehn476

BMJ 2019. http://dx.doi.org/10.1136/bmjopen-2019-030514
Eur Heart J. https://doi.org/10.1093/eurheartj/ehi115

HF: Value of GDMT (Bblkr + ACEi/ARB)

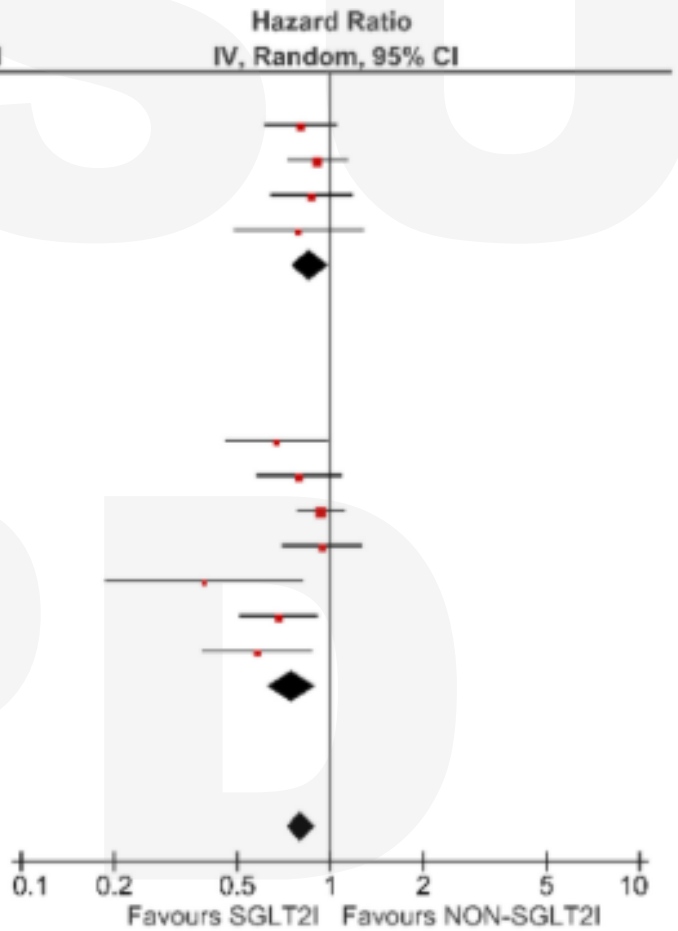


BMJ 2019. http://dx.doi.org/10.1136/bmjopen-2019-030514

HF: Value of GDMT (SGLT2i)

Comparison of SGLT2i v non-SGLT2i regimens on all-cause mortality

Study or Subgroup	log[Hazard Ratio]	SE	Weight	Hazard Ratio IV, Random, 95% CI
1.1.1 65–74 Years				
DAPA-HF	-0.22314355	0.13439438	11.1%	0.80 [0.61, 1.04]
DELIVER	-0.09431068	0.11146132	14.2%	0.91 [0.73, 1.13]
EMPEROR-REDUCED	-0.13926207	0.151711	9.3%	0.87 [0.65, 1.17]
NAKAI ET AL	-0.23572233	0.24295071	4.3%	0.79 [0.49, 1.27]
Subtotal (95% CI)			**39.0%**	**0.86 [0.75, 0.99]**
Heterogeneity: Tau² = 0.00; Chi² = 0.67, df = 3 (P = 0.88); I² = 0%				
Test for overall effect: Z = 2.14 (P = 0.03)				
1.1.2 ≥75 Years				
AGING-HF	-0.40047757	0.19294033	6.4%	0.67 [0.46, 0.98]
DAPA-HF	-0.23572233	0.15859393	8.7%	0.79 [0.58, 1.08]
DELIVER	-0.07257069	0.08769682	18.4%	0.93 [0.78, 1.10]
EMPEROR-REDUCED	-0.0618754	0.14791288	9.7%	0.94 [0.70, 1.26]
GERMÁN ET AL	-0.94160854	0.37303068	2.0%	0.39 [0.19, 0.81]
NAKAI ET AL	-0.38566248	0.14489389	10.0%	0.68 [0.51, 0.90]
NAKANO ET AL	-0.54472718	0.20468022	5.8%	0.58 [0.39, 0.87]
Subtotal (95% CI)			**61.0%**	**0.75 [0.63, 0.90]**
Heterogeneity: Tau² = 0.03; Chi² = 12.42, df = 6 (P = 0.05); I² = 52%				
Test for overall effect: Z = 3.21 (P = 0.001)				
Total (95% CI)			**100.0%**	**0.81 [0.72, 0.90]**
Heterogeneity: Tau² = 0.01; Chi² = 13.64, df = 10 (P = 0.19); I² = 27%				
Test for overall effect: Z = 4.00 (P < 0.0001)				
Test for subgroup differences: Chi² = 1.33, df = 1 (P = 0.25), I² = 24.8%				



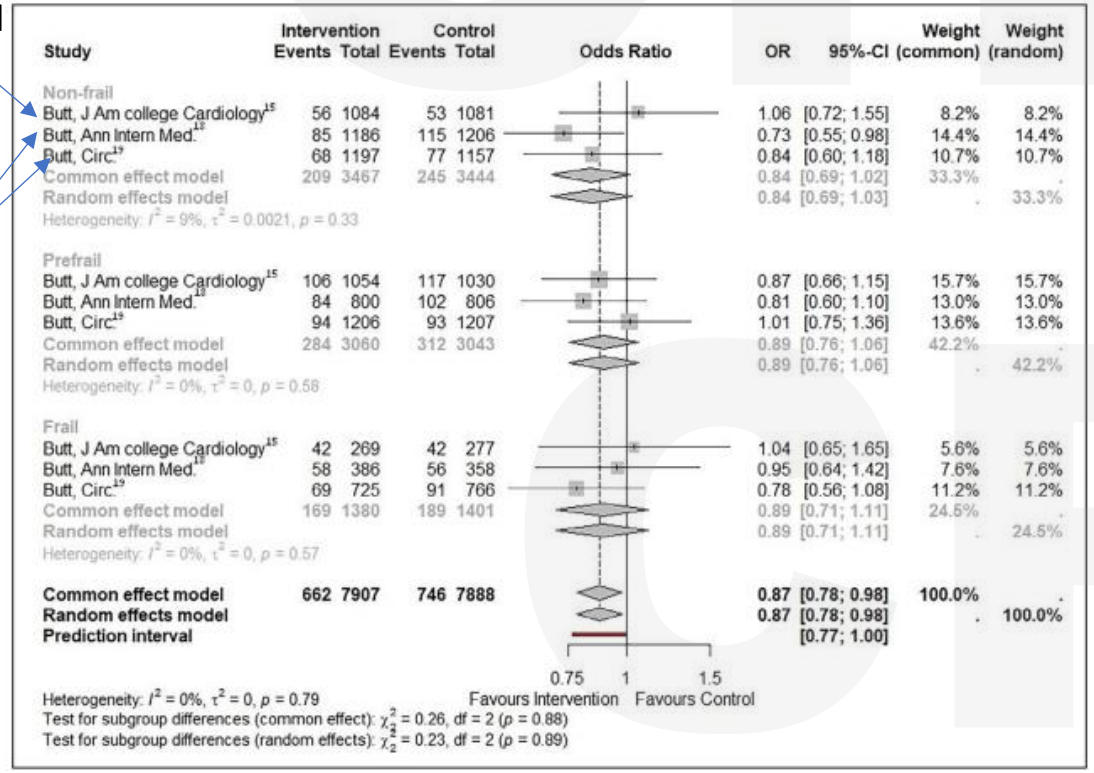
Archives Gerontology and Geriatrics 2026. https://doi.org/10.1016/j.archger.2026.106138

HF: Value of GDMT (ARB/ARNI)

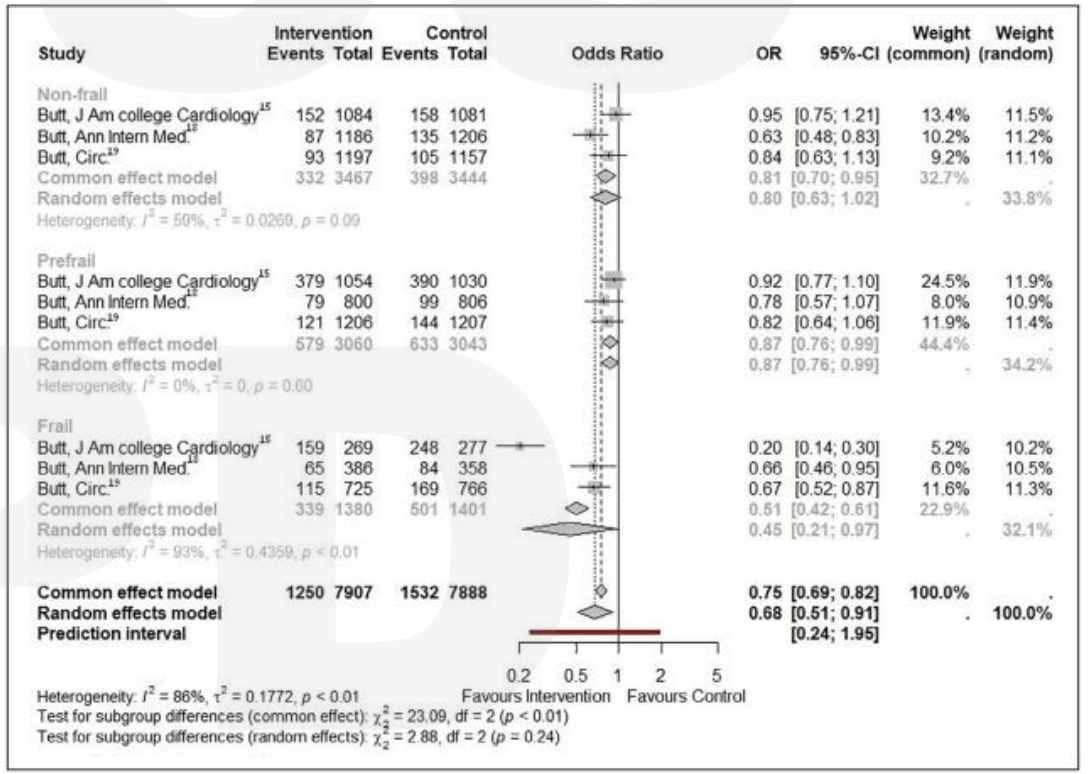
ARB/ARNI v. ARB

SGLT2i v. Placebo

Effect of ARNI and SGLT2i on CV death



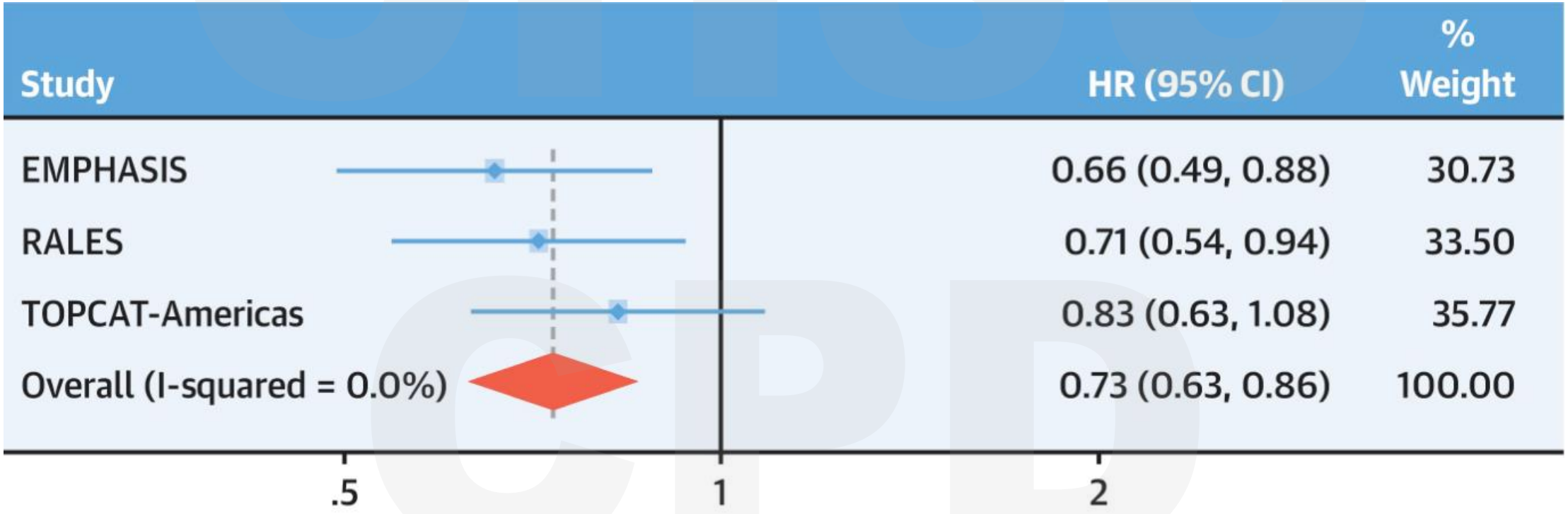
Effect of ARNI and SGLT2i on HF hosp



J Am Heart Assoc. 2025;14:e042367. DOI: 10.1161/JAHA.125.042367

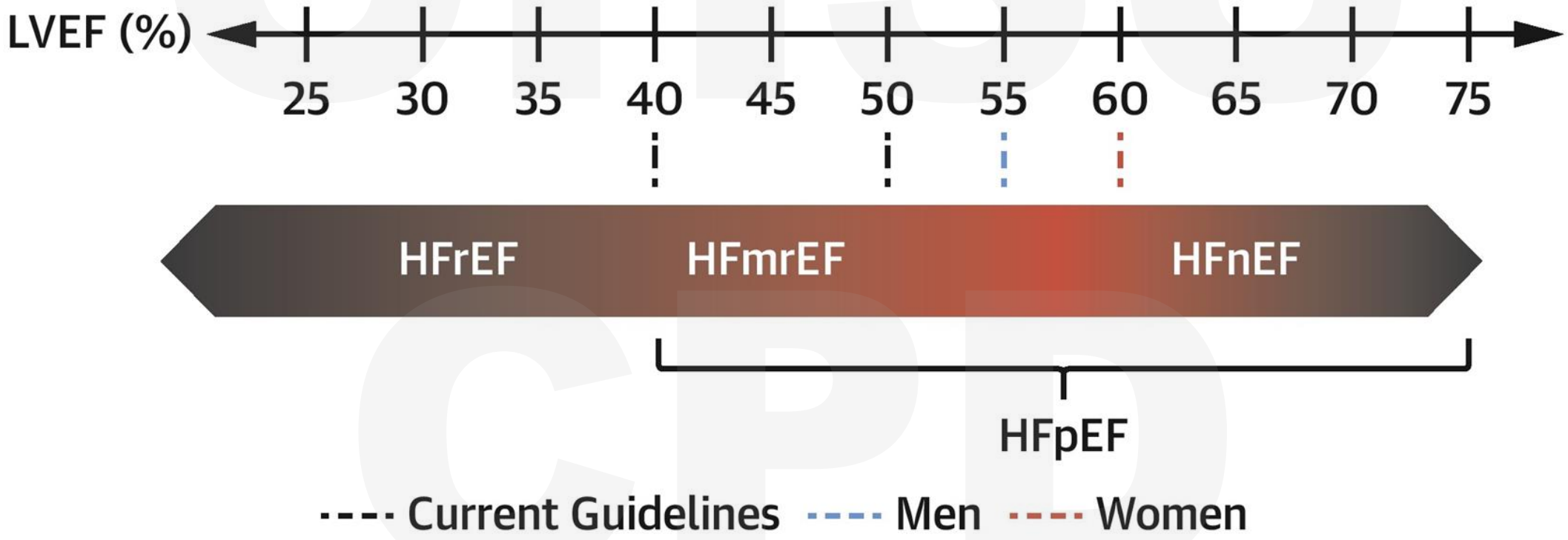
HF: Value of GDMT (MRAs)

MRA treatment effect on the overall HF population ≥75 years of age (CV death or hospitalization)



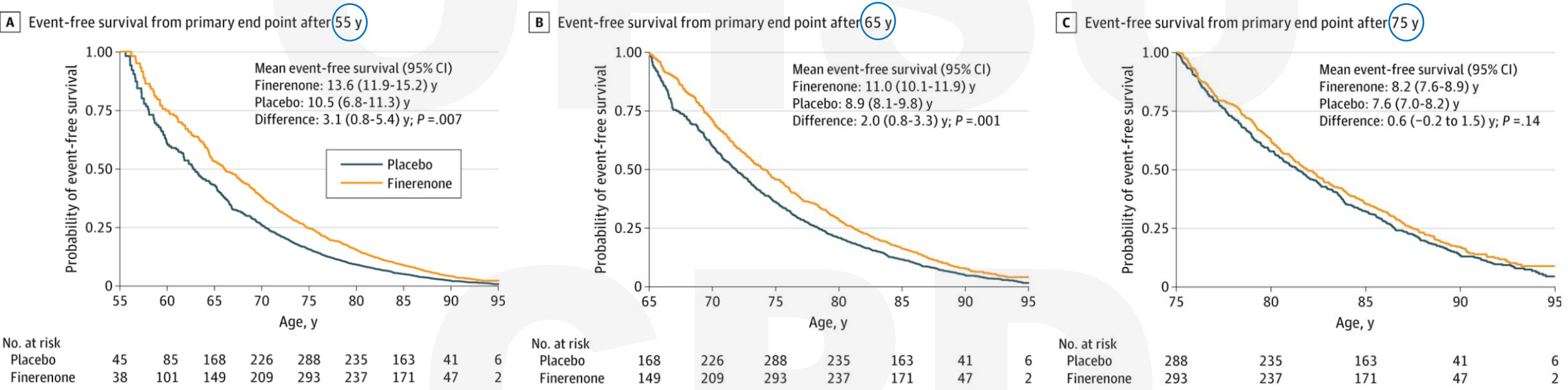
JACC: Heart Failure 2019. DOI: 10.1016/j.jchf.2019.08.017

A side note…MRAs in HFpEF



JACC. 2021;77(25):3217-25.

HFpEF: MRAs by age group

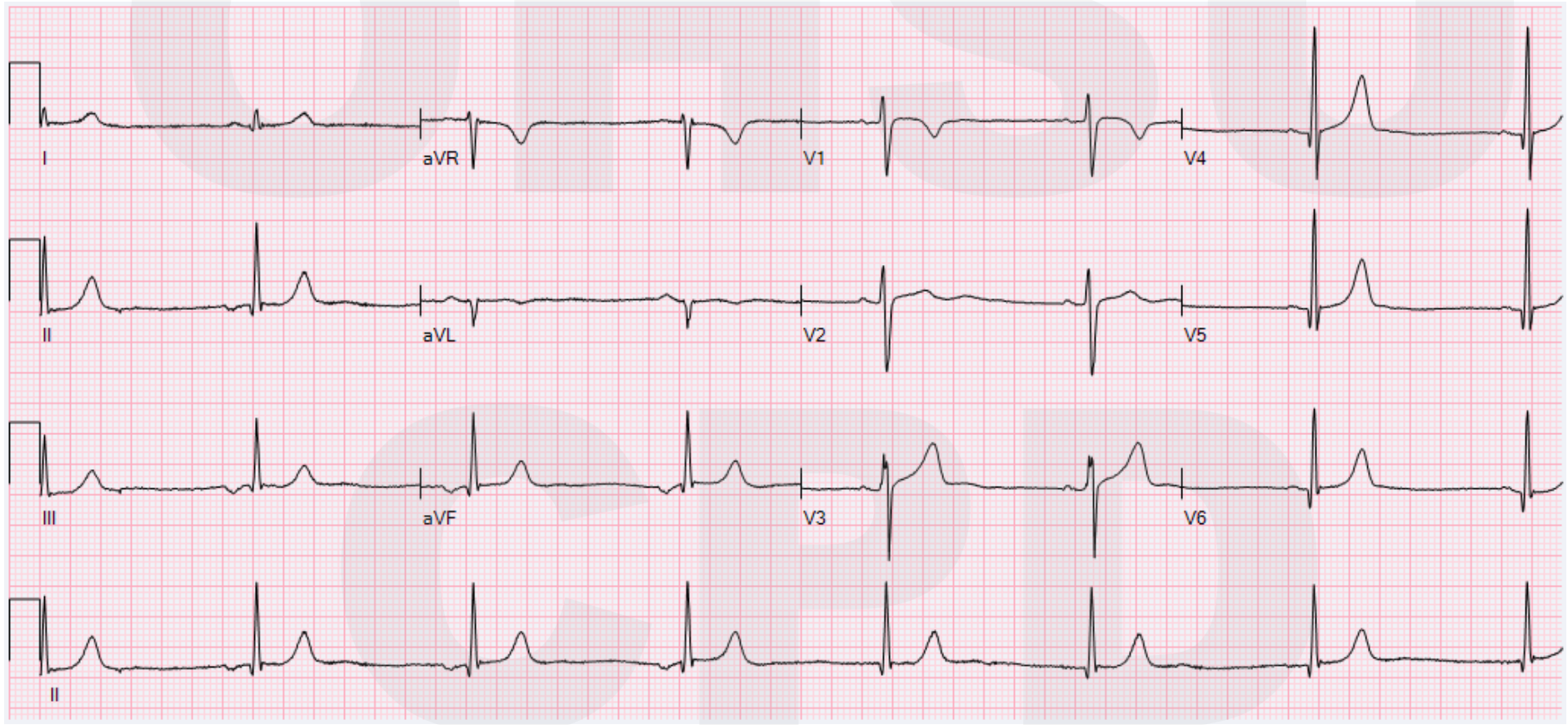


JAMA Cardiol 2025. doi:10.1001/jamacardio.2024.3782

HF: Case 2

- 68 y/o woman presented to clinic with subacute/stable exercise intolerance – becomes winded with 2 flights of stairs or briskly walking 1 mile. She has recently been diagnosed with HFpEF and started on a diuretic without improvement in symptoms.
- Additional PMHx is notable for HTN, HLD, DM2, & MI s/p remote stent. She is a former smoker.
- Vitals: 96/66 mmHg @ 56 bpm
- Exam: NAD, regular bradycardia, JVD <8 cm w/o HJR, no MRG, lungs w/ fine crackles, abd is benign, ext WWP, no LEE

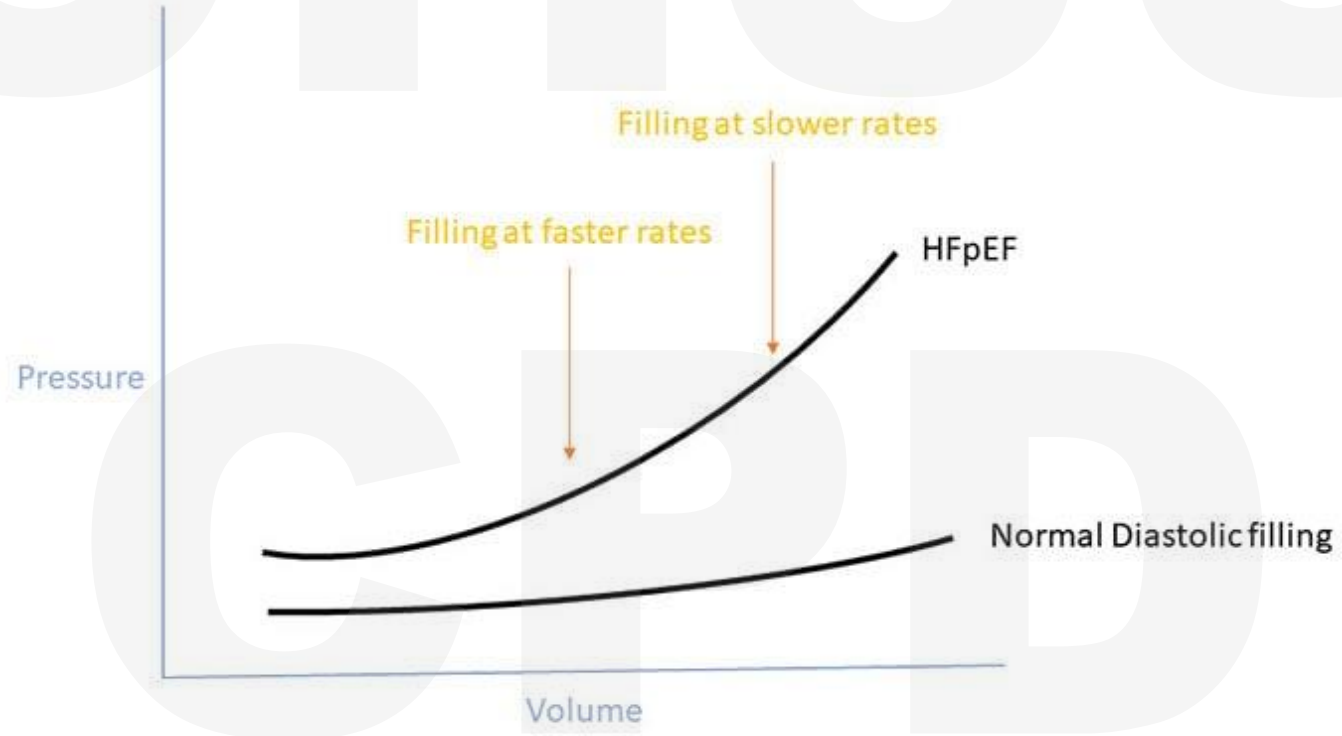
HF: Case 2, ECG



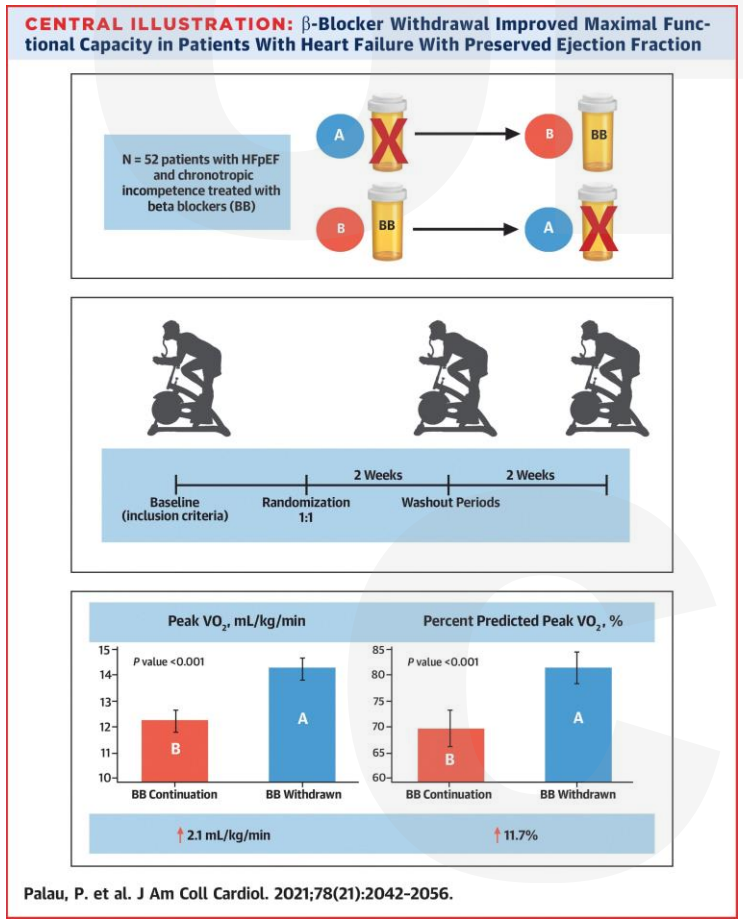
HF: Case 2, other diagnostics

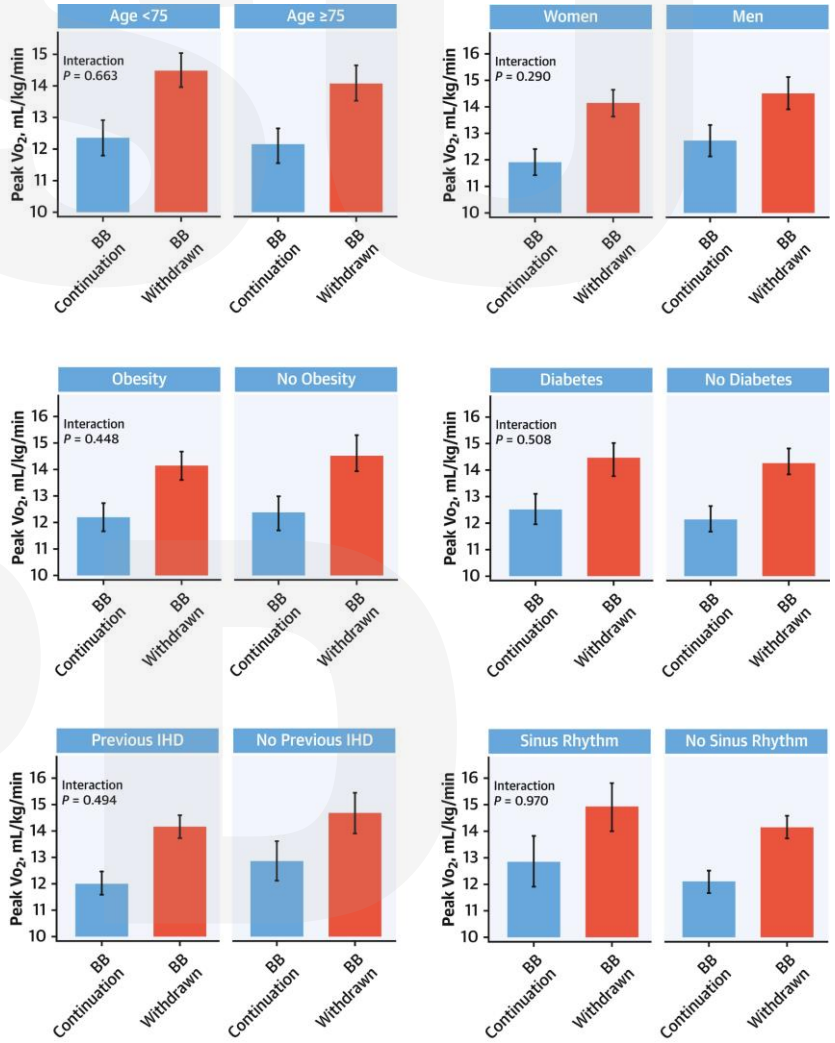
- CXR: “no acute cardiopulmonary disease”; however, flattened diaphragm, elongated cardiac silhouette; vascular markings normal/diminished
- Echo: normal LV size, LVEF 55%, normal RV size and function, mild mitral regurgitation
- MPS: negative, converted to pharm d/t inability to achieve target HR on treadmill

HF: the “diastolic” variety



HF: the “diastolic” variety





Topics

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4. Some Clinical Pearls (time permitting)

ACS: Case 1

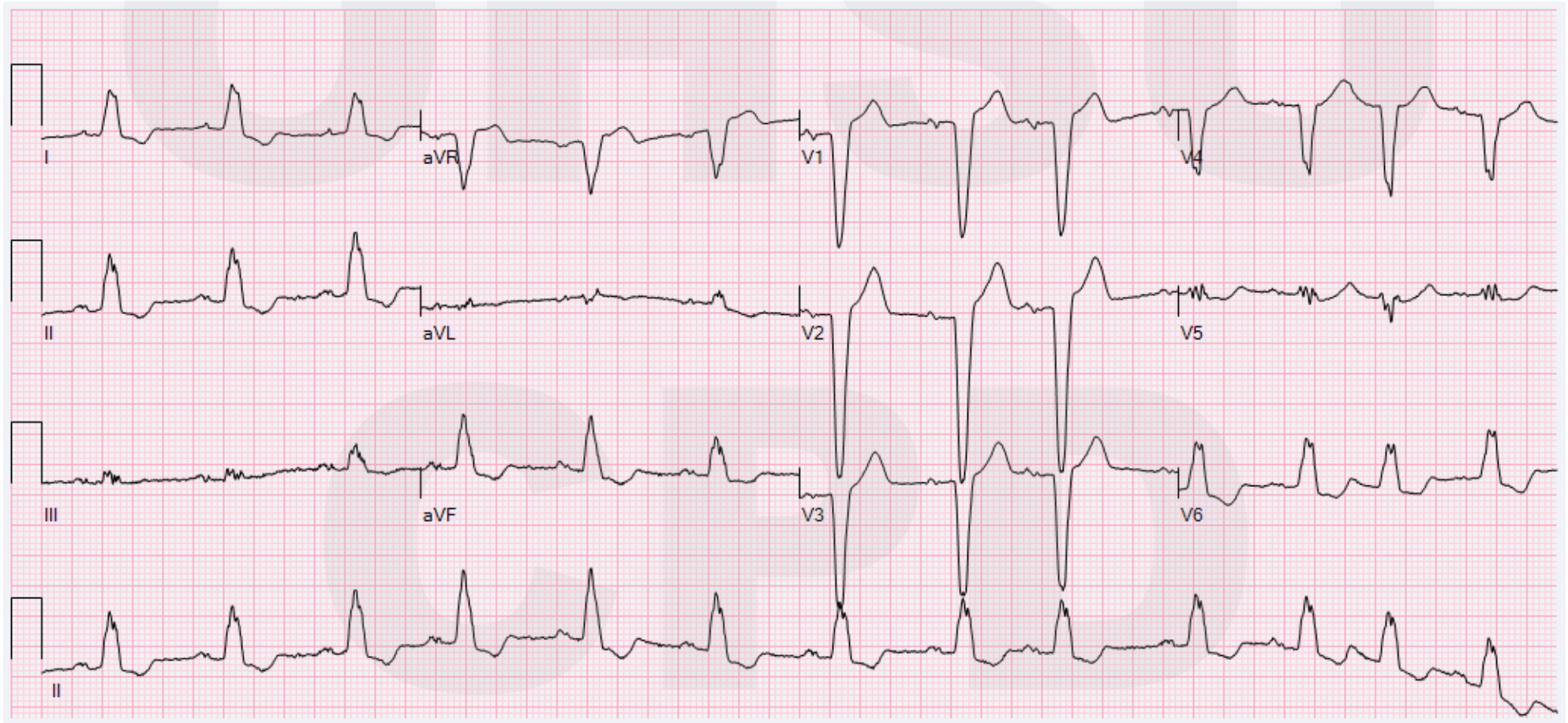
- 80 y/o man p/w dyspnea and confusion. Daughter reports patient woke early from sleep and called her “in distress”. BIBA. Endorses some nausea w/o emesis. Endorsed a urinary “accident”. No f/c. No diarrhea. Appetite is reduced. No cough. No orthopnea/PND. No weight changes. No recent falls.
- VS WNL. NAD. RRR no MRG, JVD & HJR WNL, CTAB breathing non-labored. Abd benign. Ext WWP no edema. Neuro “non-focal”.
- Additional PMHx notable for LUTS on finasteride and tamsulosin, h/o stroke on aspirin, h/o back pain/surgery on APAP and PRN Oxycodone.

ACS: Clinical history

- Chest pain history is unreliable/not predictive of ACS[1]
- Atypical symptoms (dyspnea, faintness, delirium) may be the presenting symptom for ACS[2]
- Functional and cognitive impairments are common[3]

1. JAMA Intern Med. 2016; 176:1029-1032.
2. Arch Cardiovasc Dis. 2013; 106:569-592.
3. Circ Cardiovasc Qual Outcomes 2019. 12:e005691.

ACS: Case 1 continued - the ECG is obtained



ACS: ECG

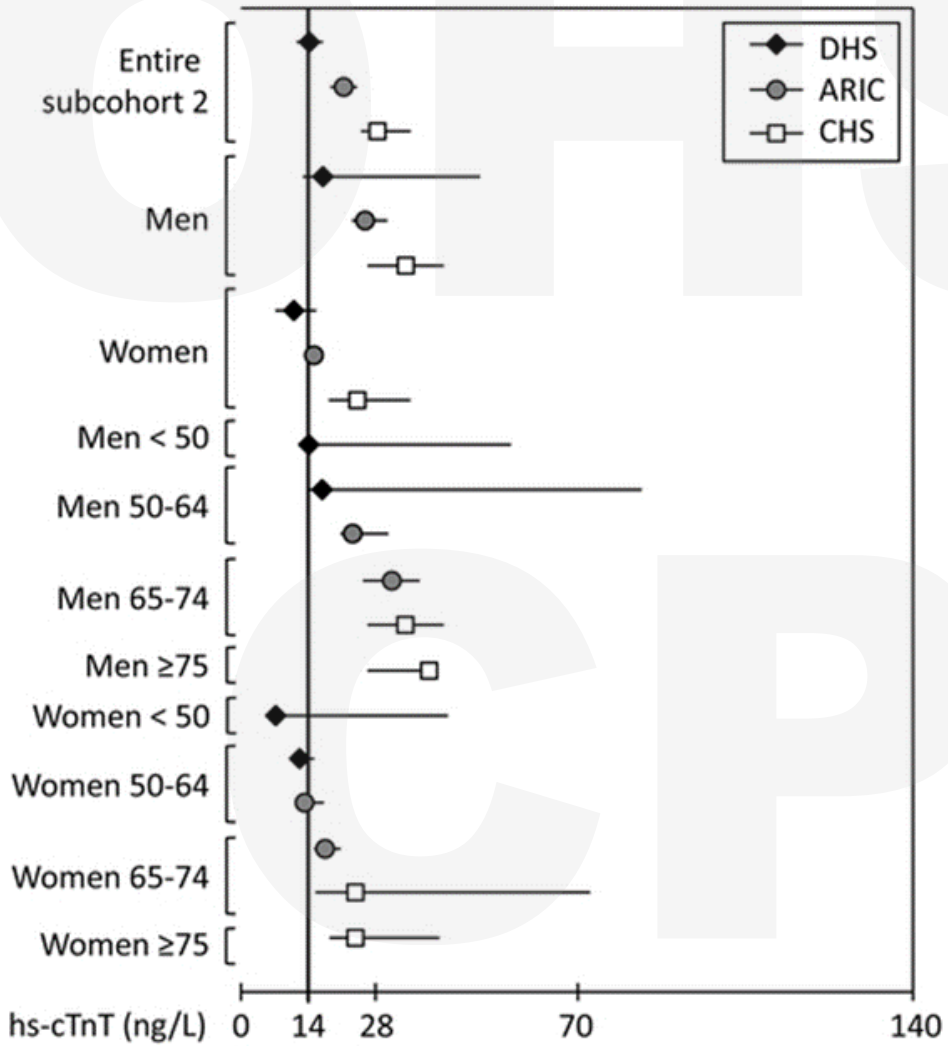
- Abnormal 70%
- LVH 20%
- RBBB 10%
- **LBBB 5%**
- AF 10%
- **Paced 5%**

Circ Arr and EP: 2020; 13:e007698.

ACS: Case 1 continued – labs return

- Chm7: Electrolytes WNL, glucose 122, Cr 2.2 (baseline 1.4)
- CBC: WBC 10, Hgb 12 (stable), Plt 170
- Hs-Trop: 53
- UA: pending – patient was unable to void

ACS: Hs-cTnT

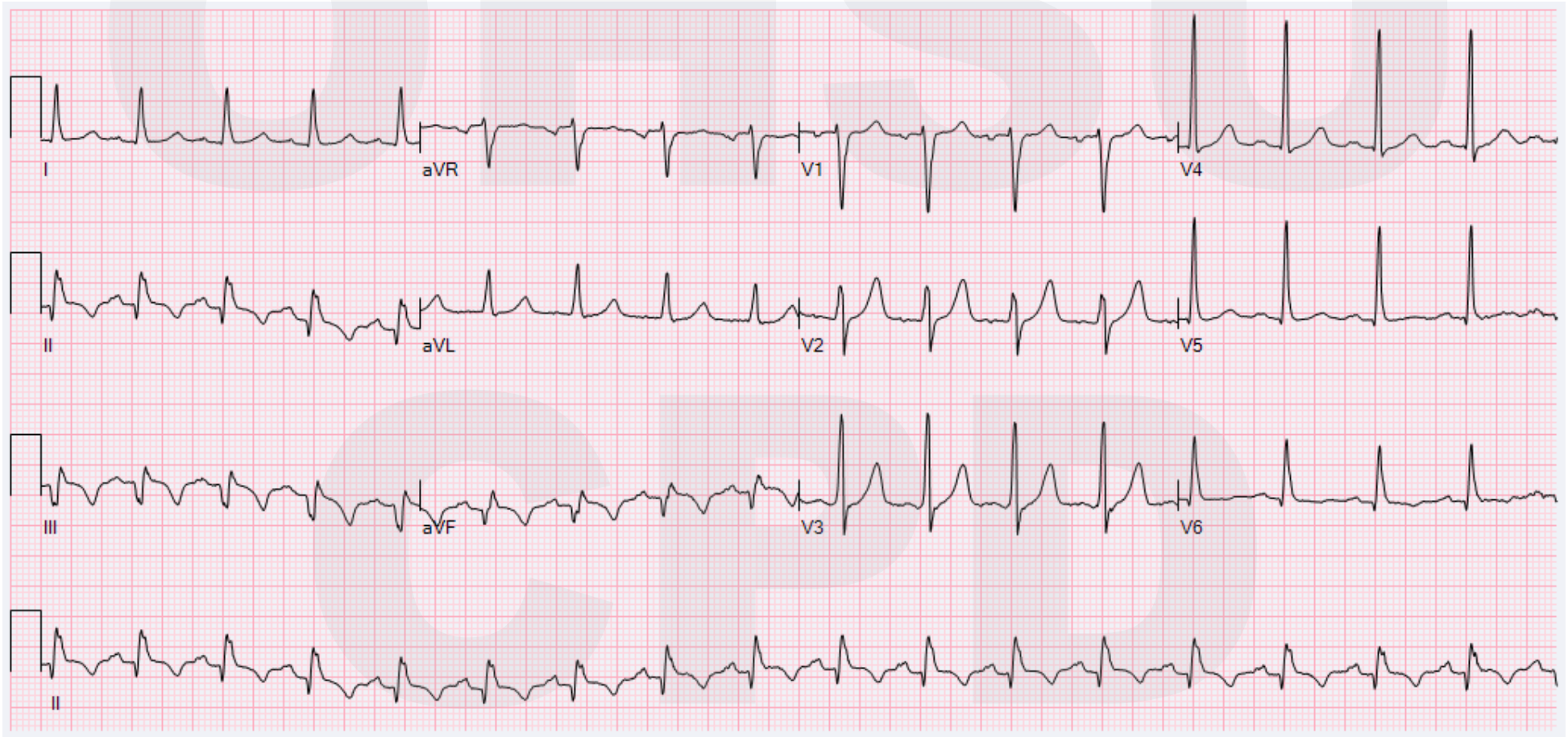


J Am Coll Cardiol 2014; 63:1441-1448.

ACS: Case 2

- 88 y/o female presenting with dyspnea, lightheadedness and diaphoresis. She had been out gardening in the heat and reports suddenly feeling weak and “overcome”. Maybe she “overdid it”. Her grandson brought her into the ED. No f/c, n/v/d. No cough. Denies chest pain, palpitations, LEE, orthopnea, PND. No epistaxis, hemoptysis, hematemesis, hematochezia, melena, or hematuria. PMHx is notable for hypertension on amlodipine, paroxysmal atrial fibrillation on apixaban (CHADS2-Vasc 4 for HTN, Age, and Female) and metoprolol. PSHx is notable for hysterectomy and cholecystectomy. She is a remote former smoker.

ACS: Case 2 continued – the ECG



ACS: Case 2 continued

- Vitals: afebrile, BP 100/80 mmHg, HR 100 bpm, RR 20, O2 95% on 2 L
- Gen: Uncomfortable appearing, diaphoretic
- CV: regular tachycardia, JVD 8-10, no MRG
- Pulm: mild tachypnea, bibasilar crackles, no rhonchi/wheezing
- Abd: soft, NT, ND, +BS
- Extr: WWP, no edema
- Neuro: face symmetric, MAE, AAOx4

ACS: Case 2 continued

- Chm7: electrolytes WNL, glucose 99, cr 1.3
- CBC: WBC 4.6, Hgb 10.1, Plt 145
- Hs-Trop T: 103, “delta” trop 206
- Nt-pro BNP 800

ACS: Case 2 continued

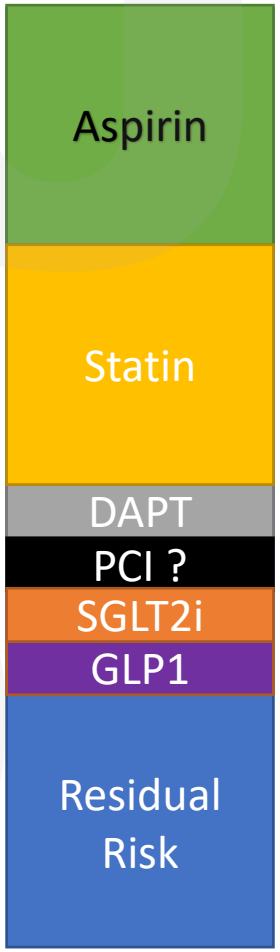
- Summarized: 88 y/o woman with HTN and paroxysmal AF suffering NSTEMI. Currently uncomfortable, tachycardic, normotensive with narrow pulse pressure, evidence of mild heart failure (i.e. Killip Class II).
  - What are your next steps?
  - Do you offer PCI?
  - What medical therapy do you recommend?

ACS: Revascularization

- Immediate primary PCI is beneficial for older patients with STEMI
- Older patients (>75 y/o) with NSTEMI do not benefit from routine invasive therapy compared with conservative management.

ACS: Pharmacotherapy

- DAPT for 1 year, aspirin lifelong
- High-potency statin lifelong
- Bblkr (incomplete revasc or reduced EF)
- ACE-I/ARB, MRA (LAD infarct or reduced EF)
- SGLT2i (in diabetes or HF)
- GLP1 (in diabetes or overweight)



ACS: DAPT – a simplification?

- DAPT indicates aspirin + clopidogrel or ticagrelor or prasugrel
  - 12 month approach is routine in patients with average bleeding risk
  - An “aspirin drop” approach (between 1-3 months after PCI) is emerging with continuation of P2Y12i for a year
  - P2Y12i is dropped after 1 year and low dose aspirin (81 mg) daily is recommended
- Routine use of PPI while on DAPT is recommended

ACS: Case 2, continued

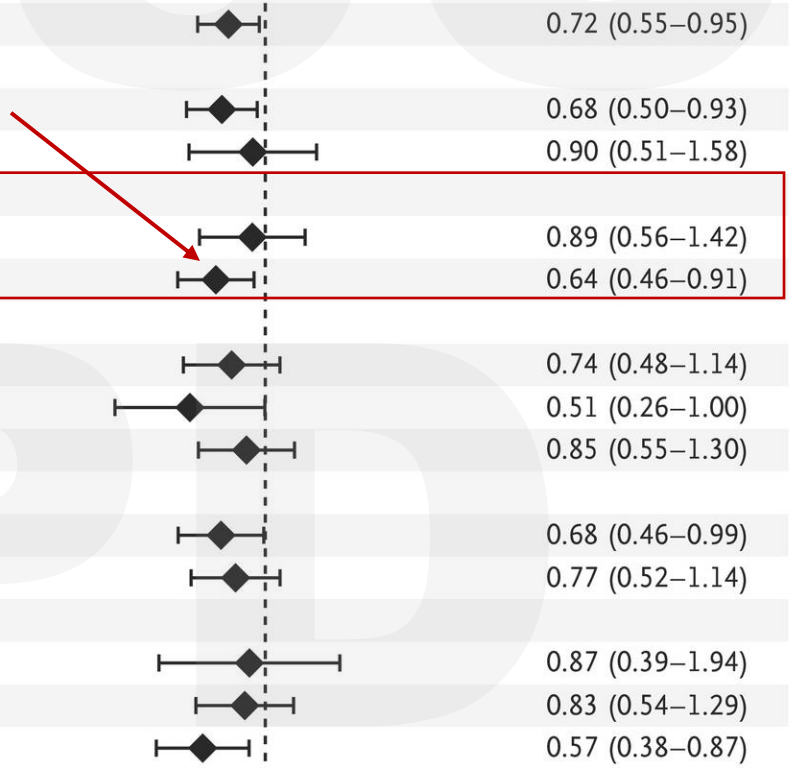
- PCI performed to proximal-RCA 99% stenosis with good result.
- Echocardiogram demonstrated normal LV size, normal RV size, moderately reduction in biventricular systolic function (LV EF 40%) and inferior/inferolateral WMAs. Additionally, mild aortic stenosis and mild-moderate mitral regurgitation were noted.

ACS (now chronic CAD): Case 2, continued

- Now 89 y/o female presenting in 1 year follow-up from her NSTEMI last year. She completed cardiac rehab and has returned to gardening Denies chest pain and gross bleeding.
- PMHx is notable for NSTEMI s/p PCI to RCA, HFrEF w/ stable LVEF (40-45%, HTN, HLD, persistent atrial fibrillation (CHADS2-Vasc 6 for CHF, HTN, Age, Female, and Vascular disease) .
- Vitals: HR 90 bpm, BP 101/76 mmhg, O2 96%, RR 14
- Exam: Irreg HR, JVD <10, lungs clear, wwp, no lee
- Meds: Apixaban, clopidogrel, atorvastatin, metoprolol succinate, and losartan
- Labs: WBC 6, Hgb 13, Plt 165, Cr 1.1, normal electrolytes and LFTs, LDL 76, HDL 30, trigs 165
- How might you “optimize” her medical therapy?

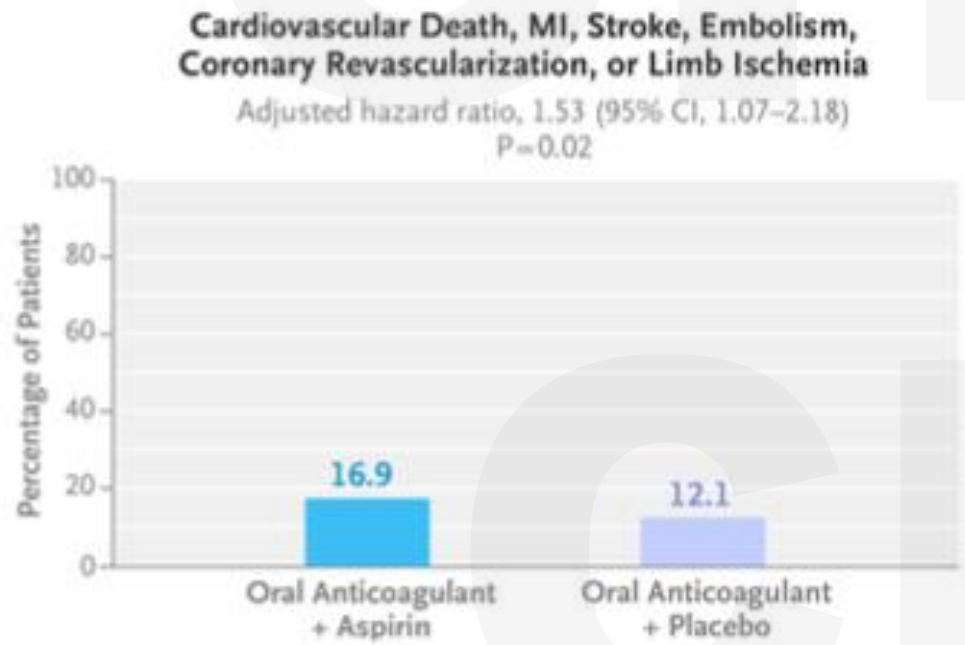
ACS: Considerations in AF (de-escalation)

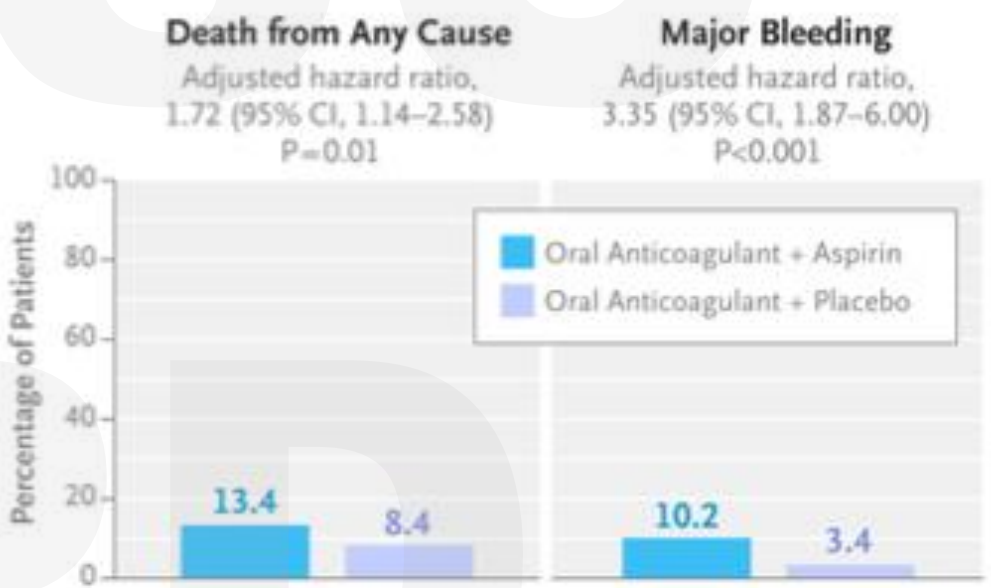
Subgroup	Rivaroxaban Monotherapy	Combination Therapy	Hazard Ratio (95% CI)
	no. of events/total no. (% per patient-yr)		
Total	89/1107 (4.1)	121/1108 (5.8)	0.72 (0.55–0.95)
Sex			
Male	66/875 (3.9)	95/876 (5.7)	0.68 (0.50–0.93)
Female	23/232 (5.1)	26/232 (5.9)	0.90 (0.51–1.58)
Age			
<75 yr	33/525 (3.2)	37/527 (3.6)	0.89 (0.56–1.42)
≥75 yr	56/582 (5.0)	84/581 (7.8)	0.64 (0.46–0.91)
Type of atrial fibrillation			
Paroxysmal	37/596 (3.2)	48/580 (4.3)	0.74 (0.48–1.14)
Persistent	13/164 (4.3)	26/175 (8.4)	0.51 (0.26–1.00)
Permanent	39/347 (5.7)	47/353 (6.9)	0.85 (0.55–1.30)
Diabetes mellitus			
Yes	45/461 (5.1)	65/466 (7.5)	0.68 (0.46–0.99)
No	44/646 (3.5)	56/642 (4.5)	0.77 (0.52–1.14)
Creatinine clearance			
<30 ml/min	11/54 (11.8)	14/60 (14.0)	0.87 (0.39–1.94)
30 to <50 ml/min	39/300 (6.9)	43/293 (8.3)	0.83 (0.54–1.29)
≥50 ml/min	36/699 (2.6)	61/686 (4.5)	0.57 (0.38–0.87)



NEJM 2019;381:1103-1113.

ACS: Considerations in AF (de-escalation)





Topics

1. Heart Failure
2. Acute Coronary Syndrome
3. Atrial fibrillation
4. Some Clinical Pearls (time permitting)

AF Case 1

- Your active 72 year-old father-in-law is concerned about developing atrial fibrillation. He has a history of BPH s/p TURP on tamsulosin, HTN on losartan, & HLD on atorvastatin. He is otherwise active/healthy. He wears an Apple watch and recently had a notification of an arrhythmia. He's very interested in taking a proactive approach and sets up a coffee time to discuss screening, anticoagulation, rate versus rhythm control, and the Watchman device!

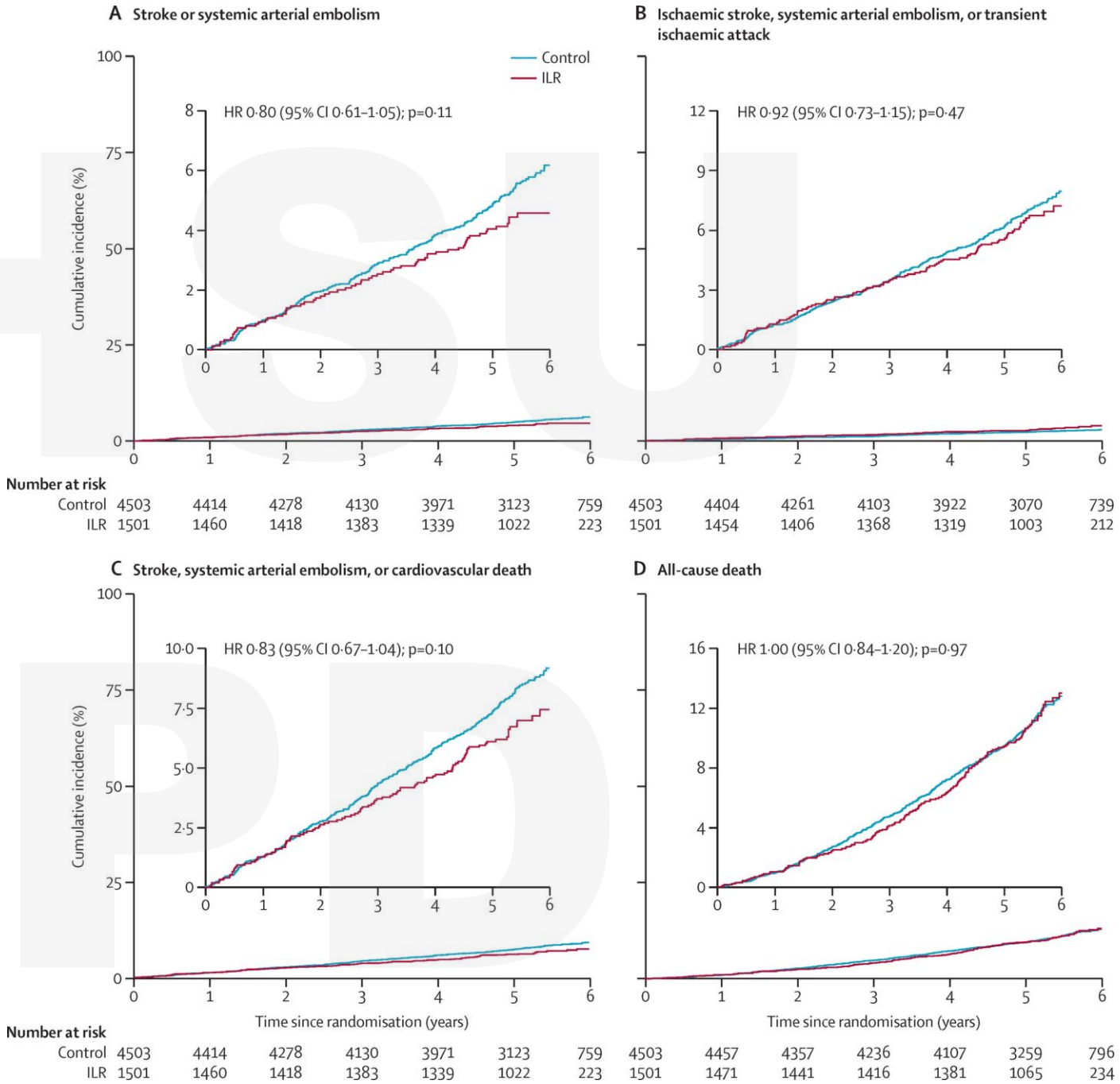
Apple Watches – PPV of AF

153 patients were diagnosed with AF out of 450 patients with a notification wore an ECG patch monitor (34% yield).

PPV of Alert for AF (photopleth)	Total Population	>65 y/o
Tachogram	0.71	0.60
Irregular	0.84	0.78

N Engl J Med 2019;381:1909-1917 DOI: 10.1056/NEJMoa1901183
Circulation. 2020;141:702–703. https://doi.org/10.1161/CIRCULATIONAHA.119.044126

Screening for AF



Lancet 2021;398:1507-1516.

AF Case 1, continued

- Your father-in-law decided to wear a ZioPatch which his PCP agreed to order. Of course it found atrial fibrillation! He was asymptomatic during the bout lasted 59 minutes at an average HR of 113 bpm and self-terminated. He thinks this may have been after he was cycling. His PCP has recommended he take a low dose metoprolol and start anticoagulation. He wants to know if you agree…

Thromboembolic/Stroke Prevention

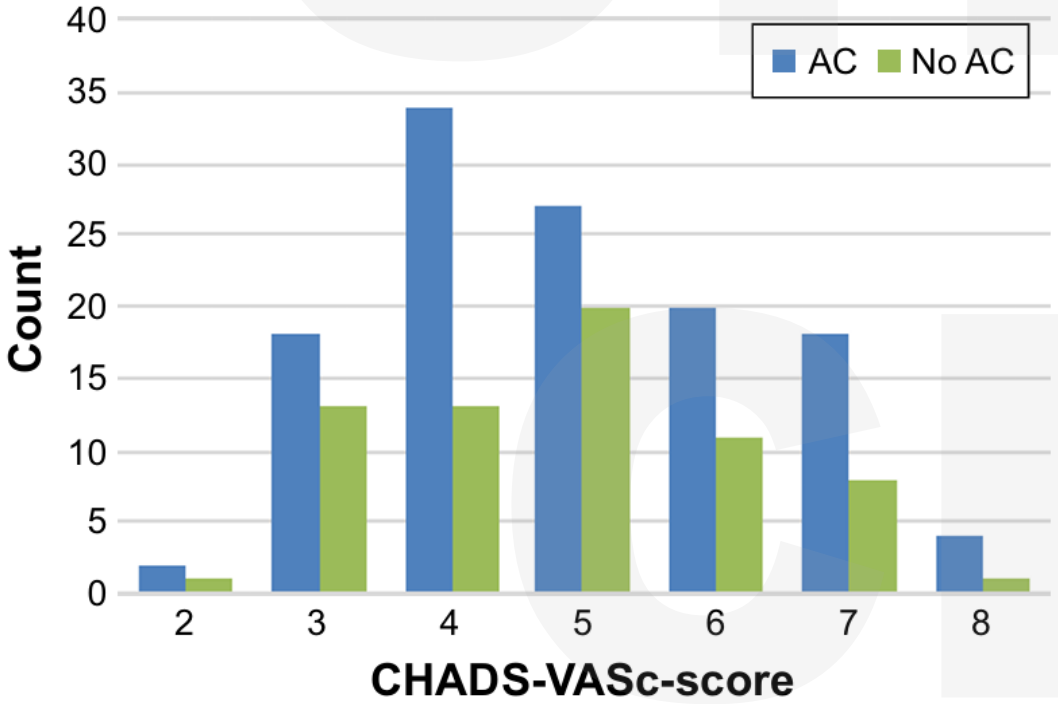
Cumulative Incidence Rate Over 5 Years after AF Diagnosis, by Age

Age Group	n	Mortality	HF	Stroke	GI Bleeding
75-79	44,396	40.1	13.3	6.9	5.9
80-84	41,450	52.1	15.1	8.1	6.4
85-89	28,657	67.0	15.8	8.9	6.6
≥90	18,511	84.3	13.7	6.9	5.4

Eur Heart J 2014;35:250-256.

Decision to Anticoagulate

Distribution of CHADS2-VASc Scores

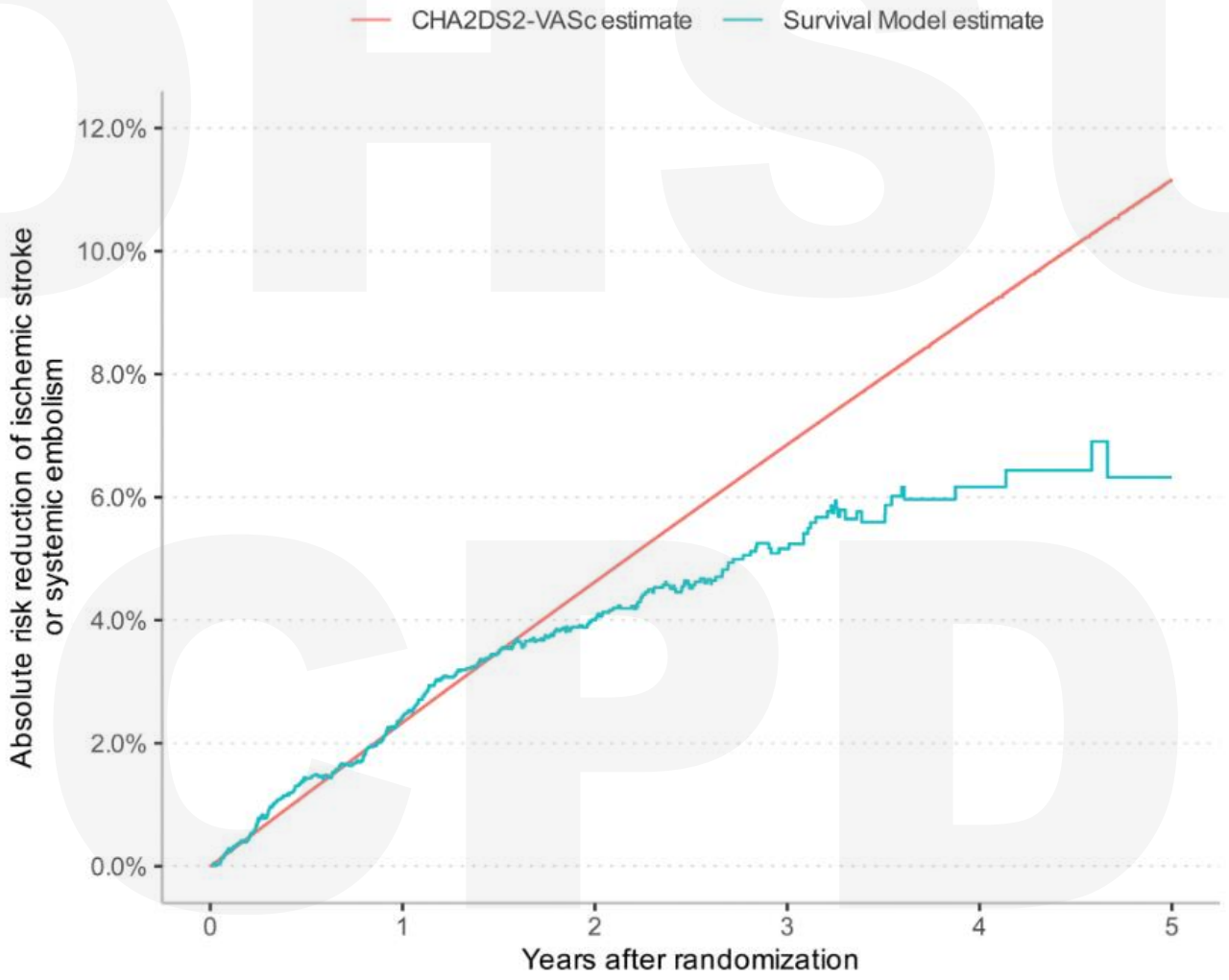


12 months outcomes

Outcomes	Patients with atrial fibrillation		
	AC (n = 119)	Non-AC (n = 71)	*p*-value
Mortality, n (%)	52 (43.7)#	33 (46.5)#	0.61
Rehospitalization, n (%)	89 (74.8)	52 (73.2)	0.87
No of hospital days, mean (SD)	28.0 (22.8)	28.2 (21.5)	0.94
Falls, n (%)	29 (24.4)	11 (15.5)	0.20
Fractures, n (%)	13 (10.9)	8 (11.3)	1.00
Ischemic stroke/TIA, n (%)	6 (5.0)	8 (11.3)	0.15
Ischemic stroke, n (%)	3 (2.9)#	7 (13.8)#	0.02
Bleeding, n (%)	7 (7.1)#	13 (23.4)#	0.005
Ischemic stroke/bleeding, n (%)	10 (9.9)#	19 (34.2)#	<0.001

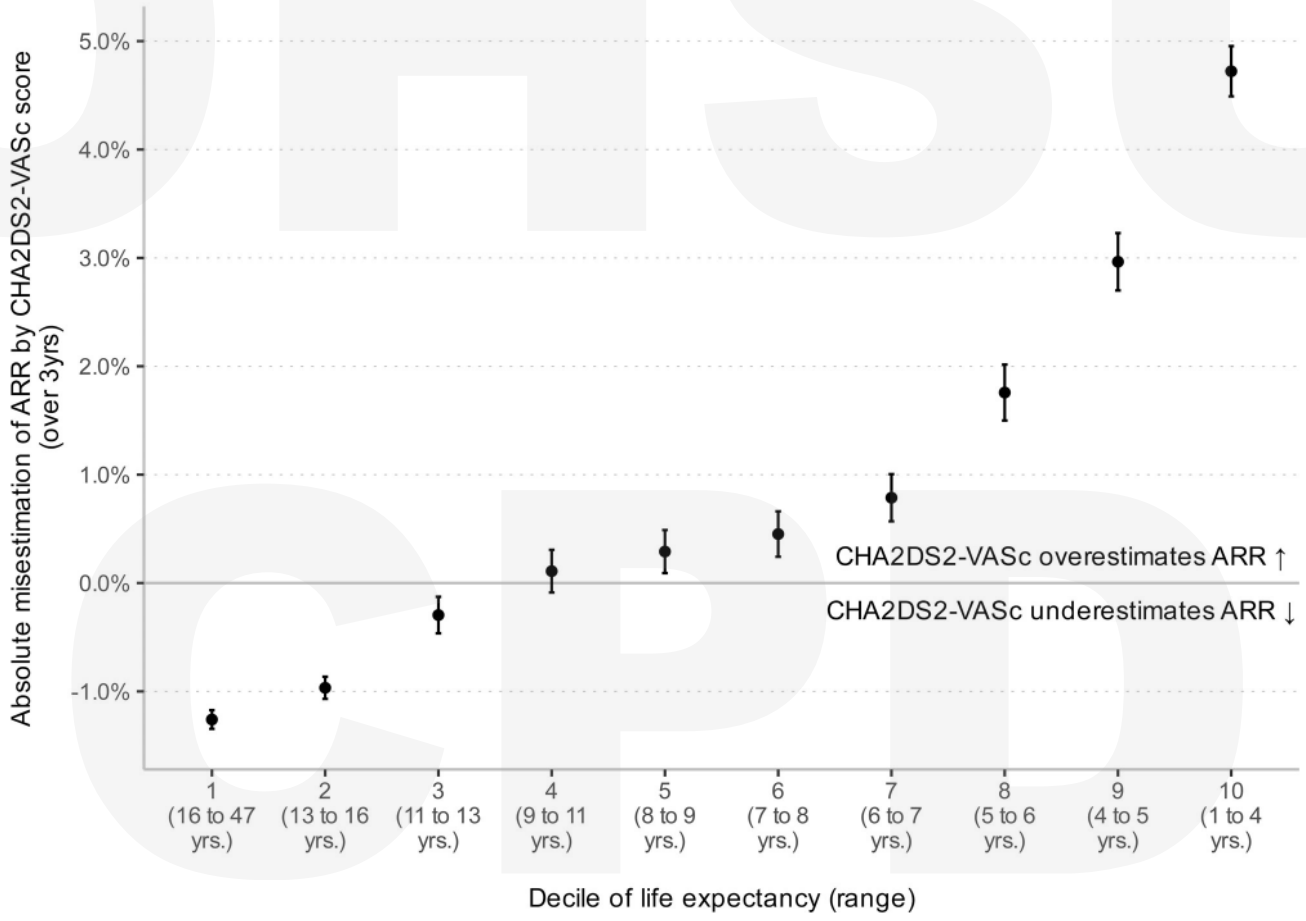
Clinical Interventions in Aging 2018:13 749–756

Estimated ARR of CHADS v. Competing Risk



https://doi.org/10.1161/CIRCOUTCOMES.123.010269

Life Expectancy and Misestimation of Benefit



https://doi.org/10.1161/CIRCOUTCOMES.123.010269

VKA v. DOACs

- VKA if mechanical valve, HCM, sarcoid, amyloid, mitral stenosis; otherwise DOAC
- Dose adjust DOAC (apixaban unless once daily dosing is important, then rivaroxaban)
  - Apixaban
    - standard dose: 5 mg twice daily
    - Reduced dose: 2.5 mg twice daily if 2 of 3 criteria are present: age >= 80, weight =<60kg, sCr >=1.5
  - Rivaroxaban
    - standard dose: 20 mg daily (with meal)
    - Reduced dose: 15 mg daily if CrCl 15-49 mL/min

AF Case 1, continued

- Your father-in-law, now certain he is more fatigued with his AF (or is it the metop?), is planning to see an EP doc. He wants your take on rhythm control strategies and if he should get this new pulsed field ablation his friend just had.

AF Case 1, continued

- Also, your father-in-law is worried about getting hit by a car or crashing on his bicycle and bleeding out. He's heard about the Watchman on the radio and is planning to ask about getting one of those, as well!

Topics

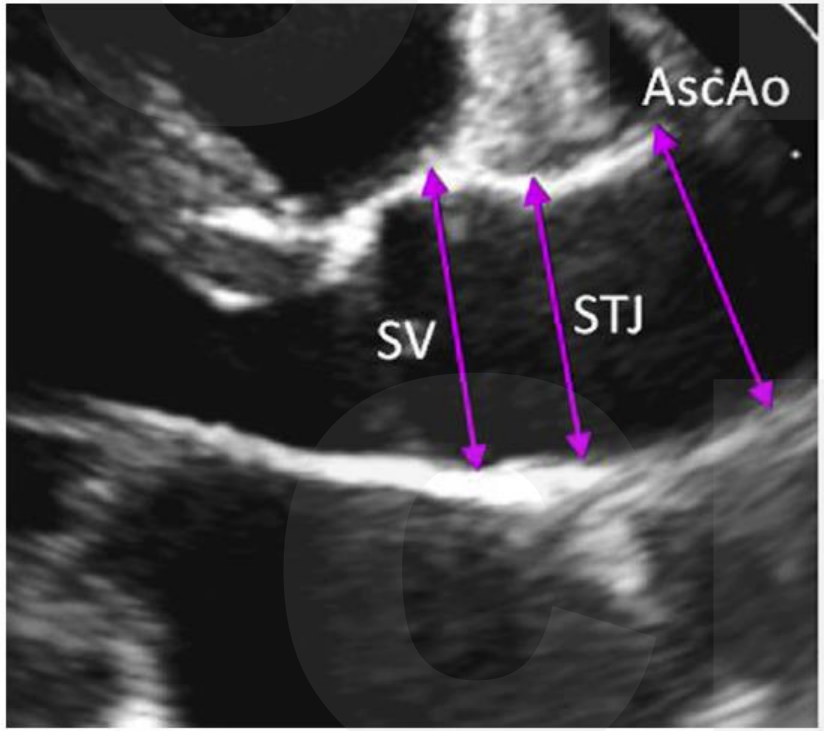
1. Heart Failure
2. Acute Coronary Syndrome
3. Atrial fibrillation
4. Some Clinical Pearls (time permitting)

Pearl 1 – The ascending aorta

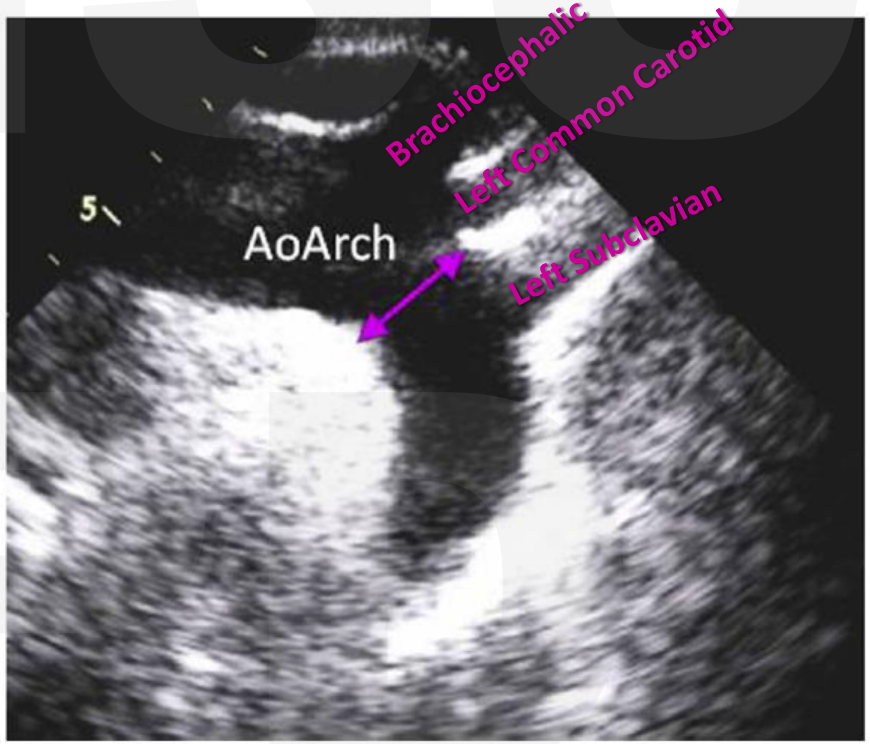
- 80 y/o man obtains an echocardiogram. Buried in the report is ‘mildly dilated aortic root (4.3 cm), effacement of the sinotubular junction, and mildly dilated ascending aorta (4.1 cm).” There is no history of thoracic aortic aneurysm. What are your thoughts?

Measurements of the Aorta

Parasternal Long Axis

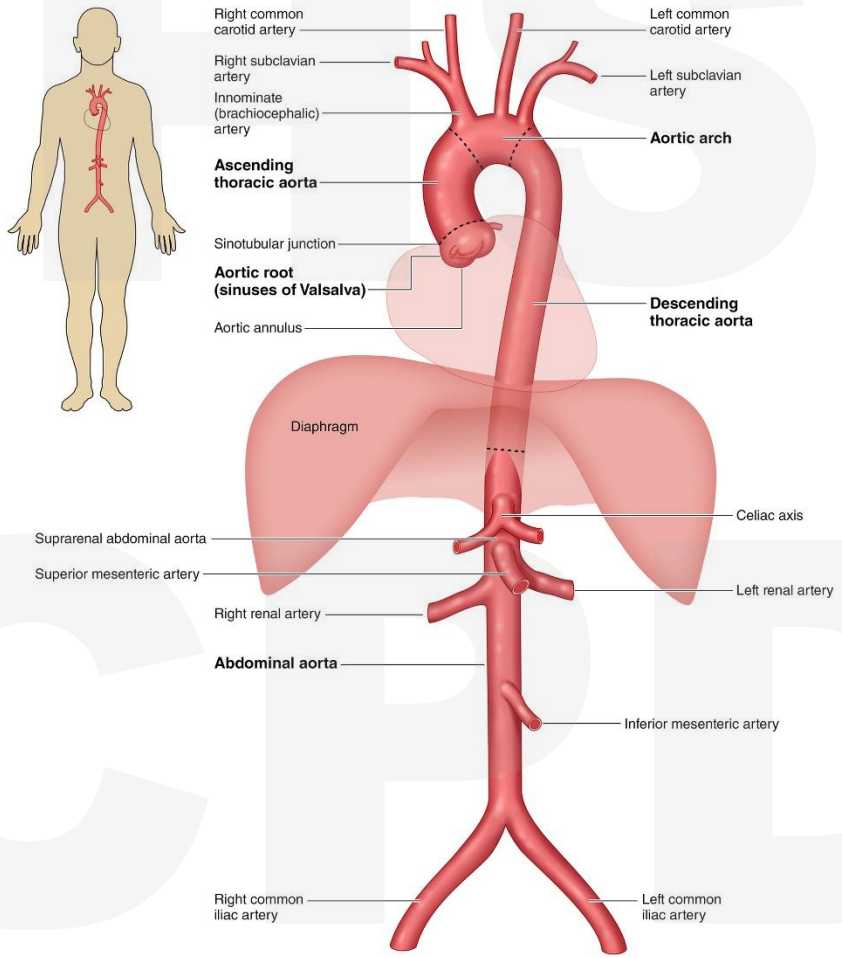


Suprasternal Notch



J Am Soc Echocardiogr 2016;29:827-37.

Anatomy of the Aorta



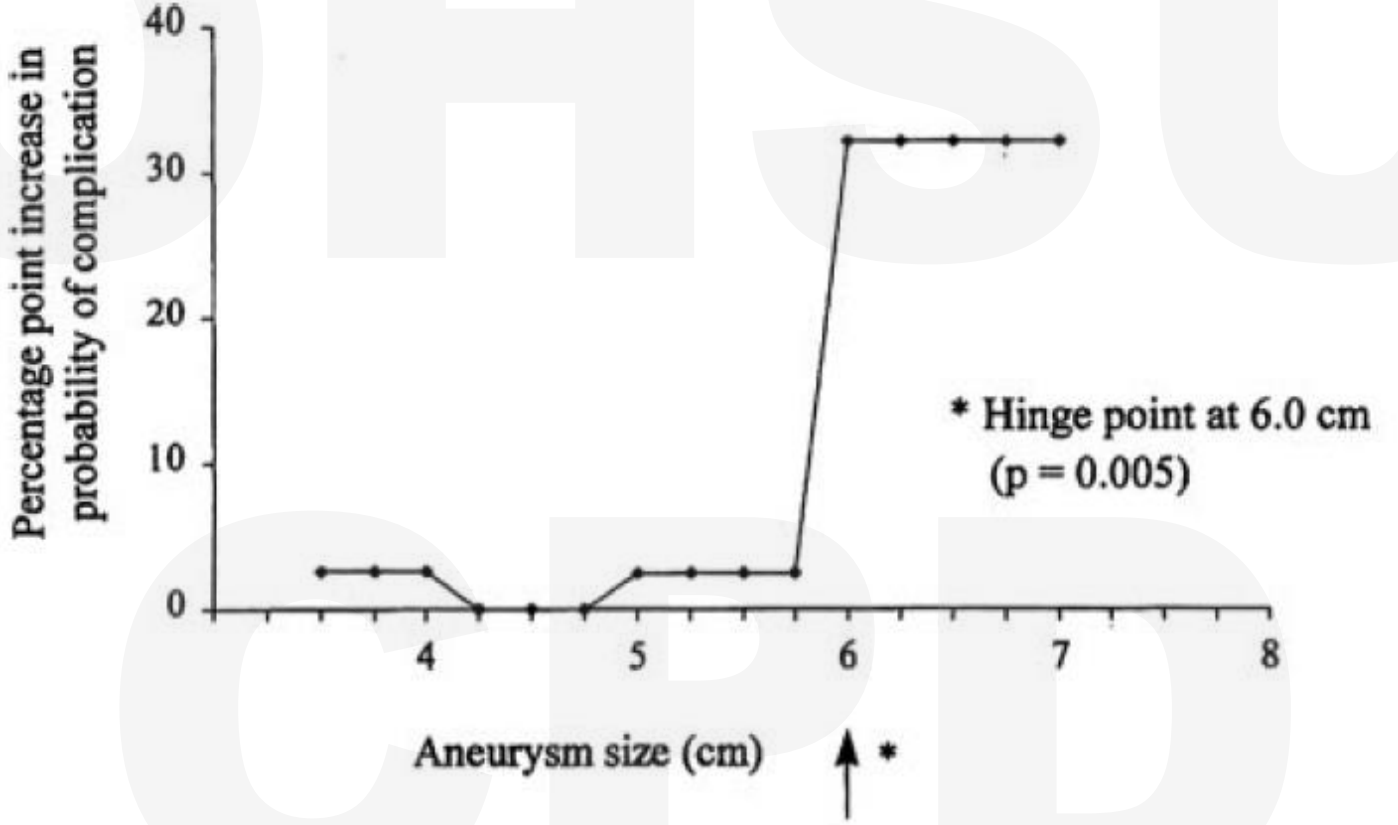
Circ 2022;146(24)

Ranges for aortic measurements separately by age & sex

	SV (mm)	STJ (mm)	AscAo (mm)	AoArch (mm)
Overall	33.9 ± 4.2	25.1 ± 3.9	33.5 ± 4.5	25.1 ± 3.8
Women				
<50 y	29.8 ± 3.1*	22.1 ± 2.9*	29.3 ± 3.8*	22.7 ± 3.2*
50–59 y	33.0 ± 3.0*	24.5 ± 3.4*	32.9 ± 3.9*	25.1 ± 3.2*
60–69 y	33.1 ± 2.6*	24.2 ± 2.7*	33.8 ± 3.0*	24.4 ± 2.8*
70–79 y	34.0 ± 3.1*	25.4 ± 3.2*	35.9 ± 3.3	25.7 ± 3.5
≥80 y	33.1 ± 3.4*	24.8 ± 3.7*	35.9 ± 4.3	24.8 ± 3.5
Overall	32.4 ± 3.3*	24.0 ± 3.3*	33.0 ± 4.3*	24.4 ± 3.4*
Men				
<50 y	33.1 ± 4.9	24.9 ± 3.9	31.2 ± 4.3	24.3 ± 3.4
50–59 y	36.6 ± 2.9	26.8 ± 3.8	34.4 ± 2.8	26.5 ± 3.8
60–69 y	37.4 ± 3.4	27.6 ± 4.4	36.8 ± 4.0	28.0 ± 4.5
70–79 y	36.9 ± 3.2	27.7 ± 3.5	36.5 ± 3.4	26.8 ± 3.9
≥80 y	38.5 ± 2.7	27.8 ± 2.3	38.0 ± 2.5	25.1 ± 2.6
Overall	35.3 ± 4.5	26.3 ± 4.1	33.9 ± 4.6	25.9 ± 4.1

J Am Soc Echocardiogr 2016;29:827-37.

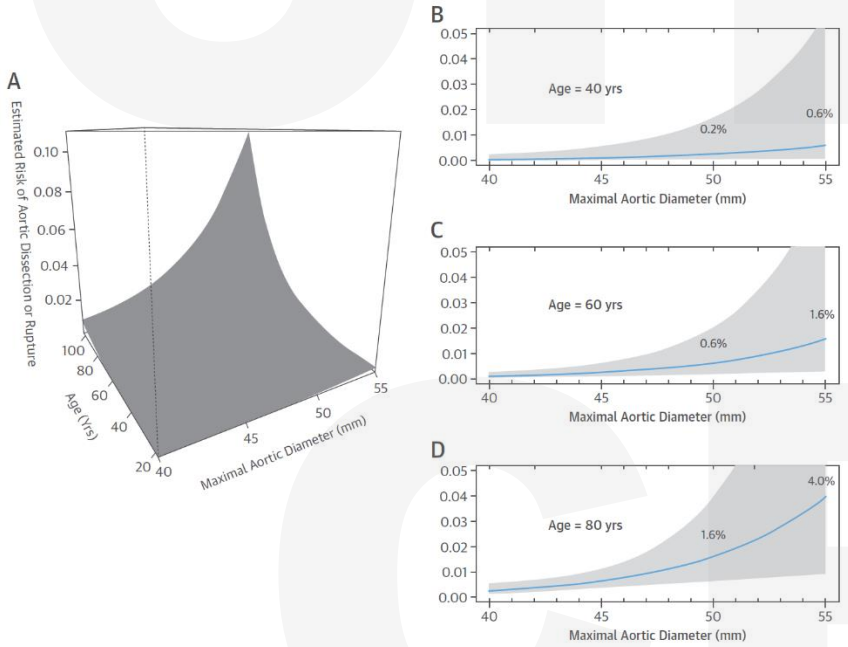
Effect of aortic aneurysm diameter on risk of complication



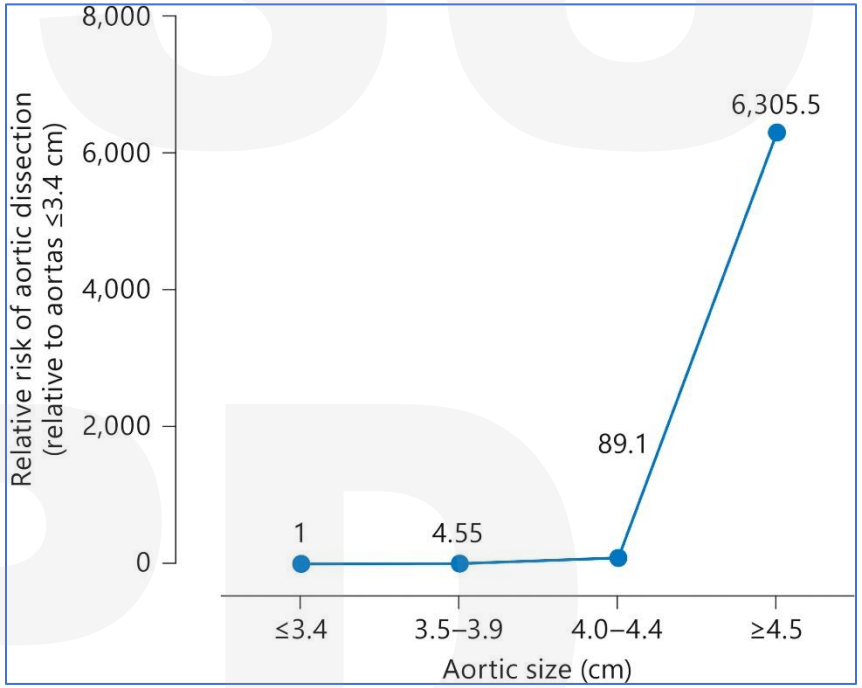
Estimated effect of ascending aortic aneurysm size on risk of complication.

Ann Thorac Surg 2002;74:S1877-88.
*Circ 2007;116(10):1120.

Estimated Probability of Aortic Dissection or Rupture Within 5 Years



J Am Coll Cardiol 2016;68:1209-19.



Cardiology 2015;131:265-72.

KISS: Ascending Aorta

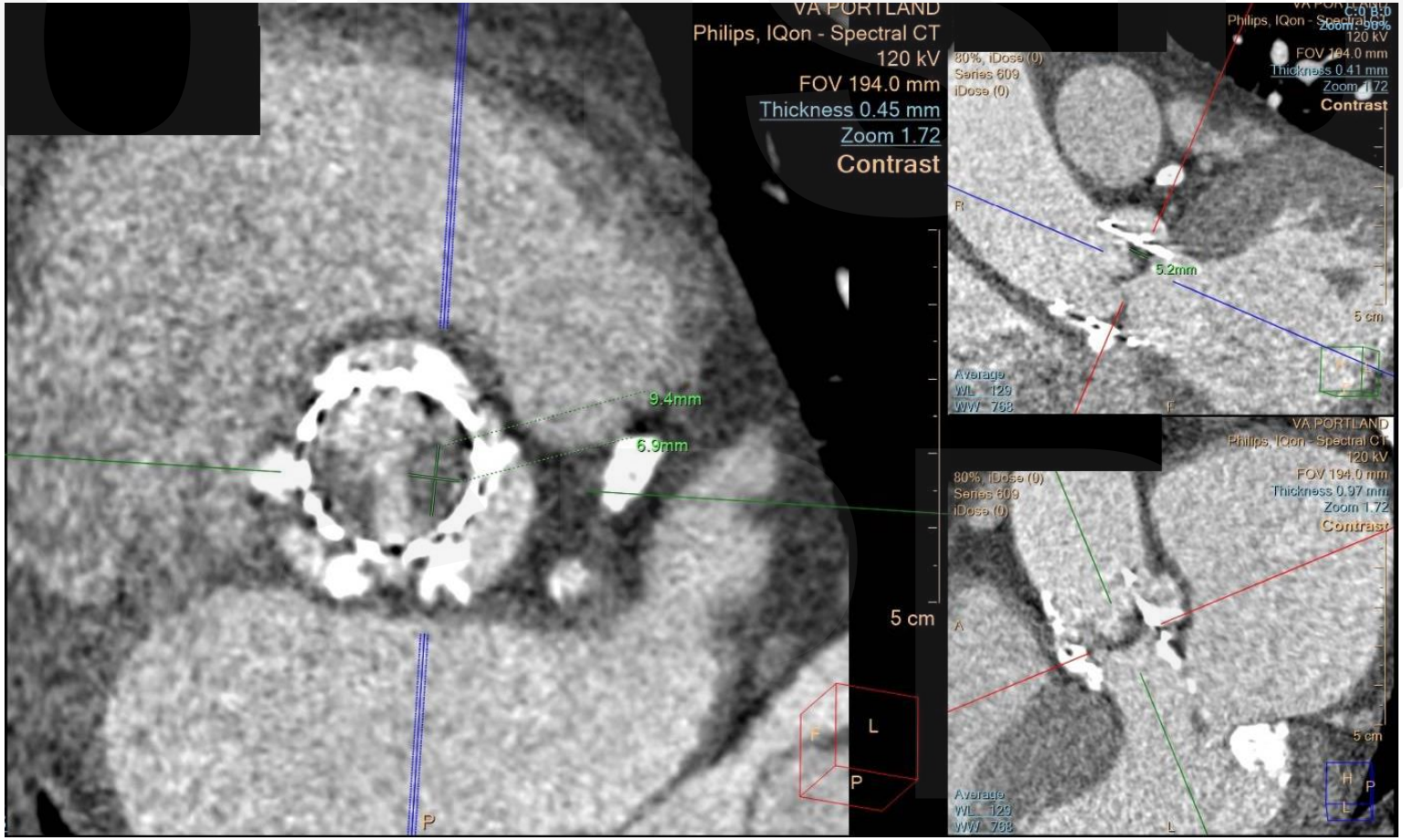
- Dilated 4.0-4.4 cm
- Aneurysmal >=4.5 cm
- Offer operation >5.0 cm

- Annual surveillance (gated CTA preferred)

Pearl 2 – TAVR dysfunction

- 88 y/o man with prior remote CABG and now with TAVR one year ago presents in clinic for routine follow-up. He had an echocardiogram earlier in the day and the report is available which reads: "Velocities across the bioprosthesis in the aortic position are increased beyond expected range. Compared with prior echocardiogram from 9 months ago the peak velocity has increased from 2.4 m/sec to 3.6 m/sec." What should you consider?

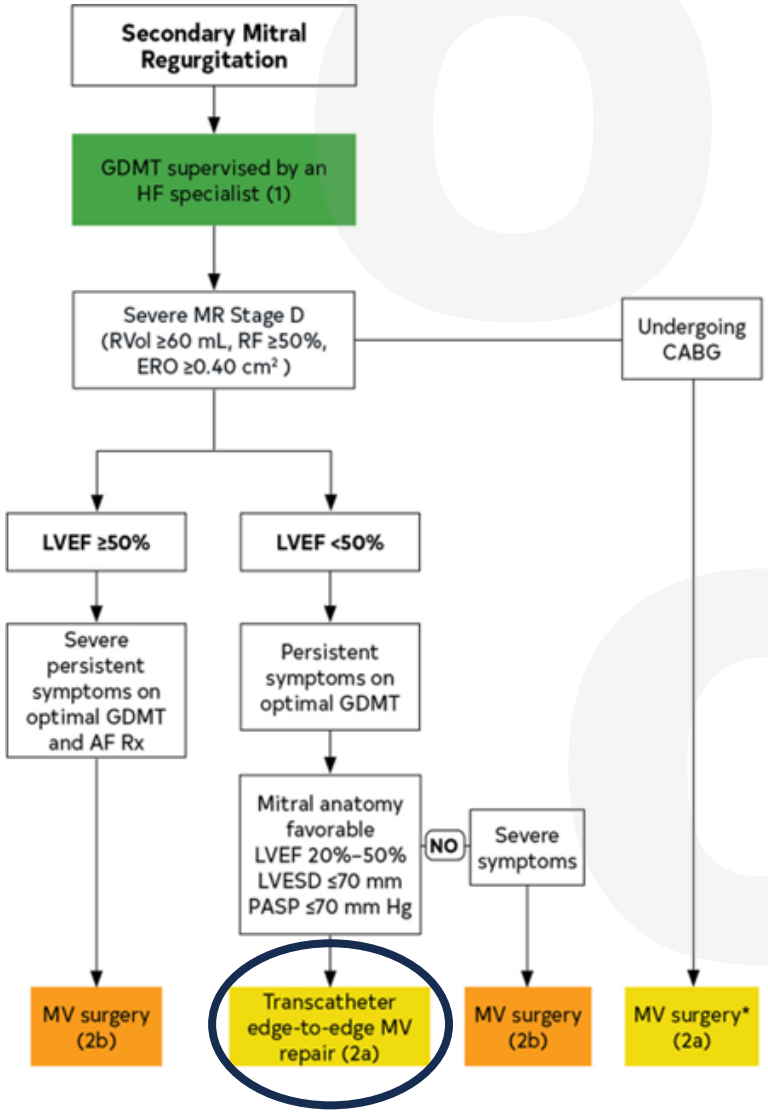
Valve Thrombosis

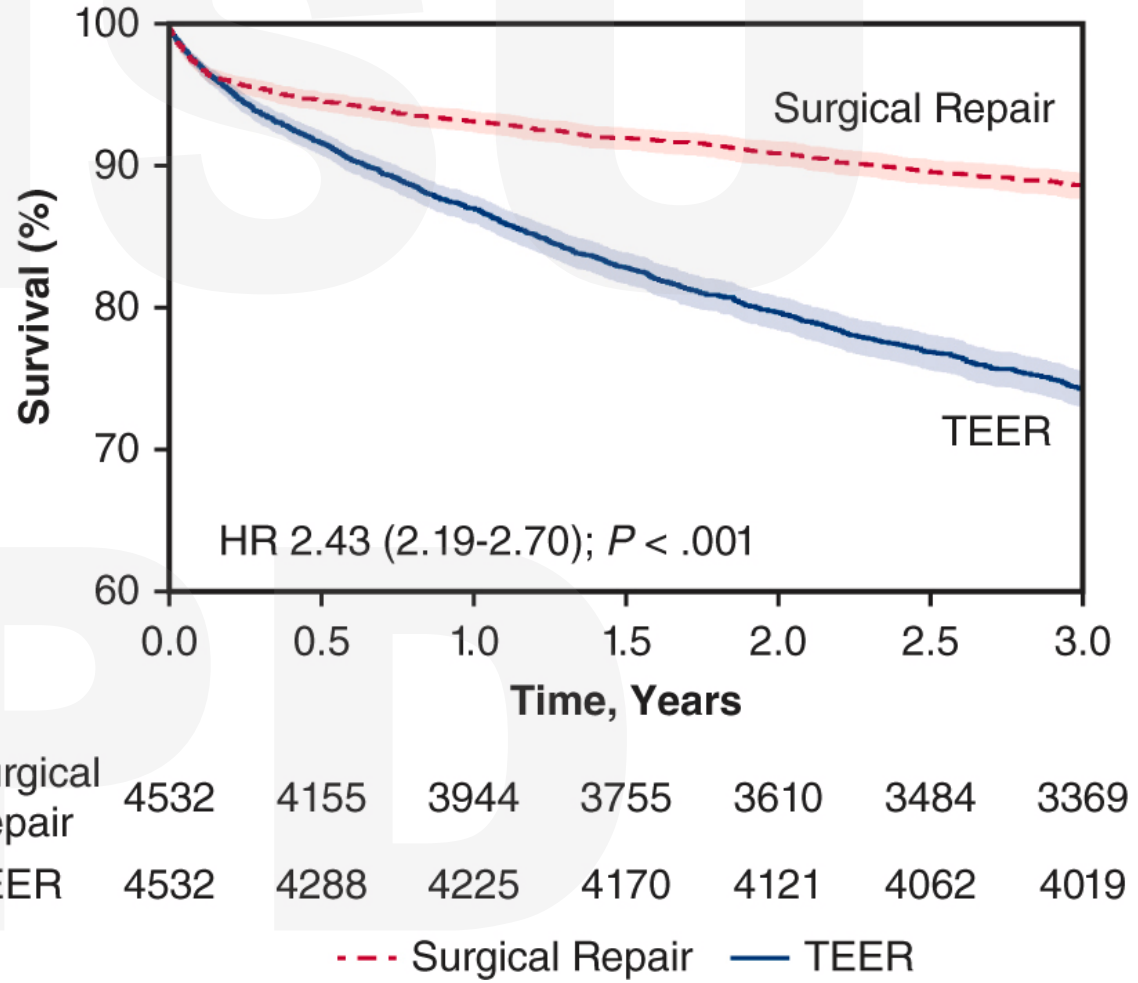


Pearl 3 – Severe mitral regurgitation

- 66 year-old man with a history of non-ischemic cardiomyopathy (lowest EF 30%) and is on appropriate GDMT (EF recovered to 50%) presents for follow-up. He was previously NYHA II, however, his dyspnea is now NYHA III despite appearing “euvolemic” on exam. You repeat an echocardiogram which demonstrates a mild-moderately dilated LV, EF 40%, severe MR, and PASP 45-50 mmHg.

Severe Degenerative Mitral Regurgitation





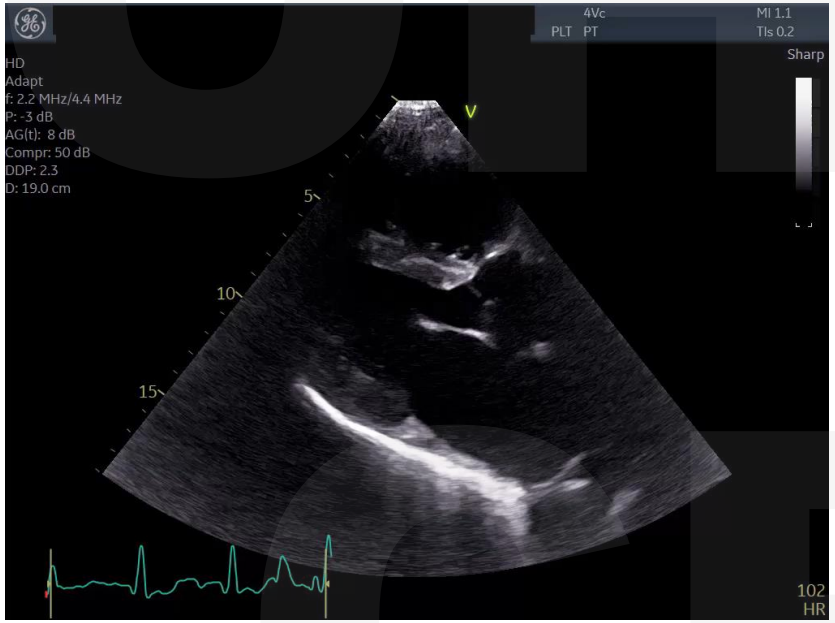
https://doi.org/10.1016/j.jtcvs.2024.01.014

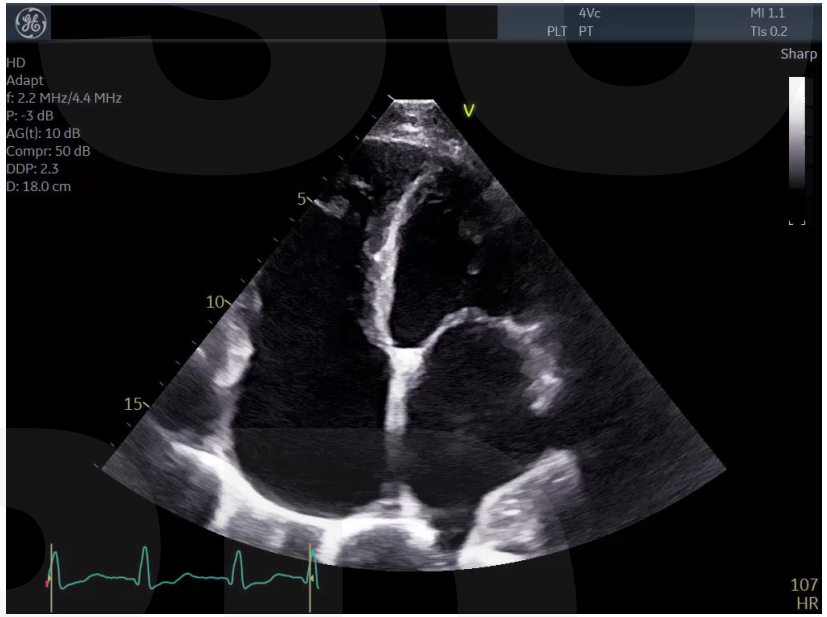
Pearl 4 – Detecting Pulmonary Hypertension

- TR velocity ≥2.9 m/s

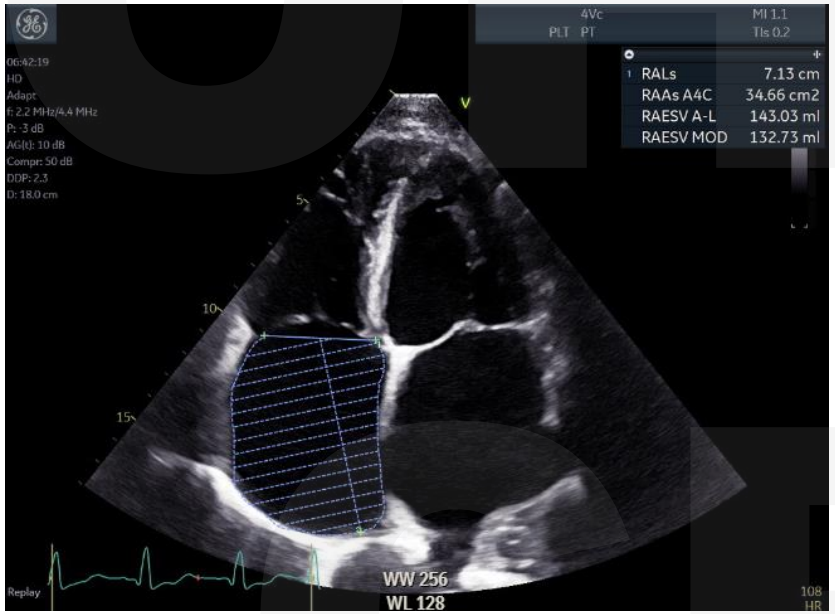
- TR velocity ≥2.8 m/s *and 2 or more of the following*
  - Dilation of the right heart chambers
  - RV hypertrophy
  - Short acceleration time
  - Elevated PAEDP
  - Abnormal LV eccentricity index

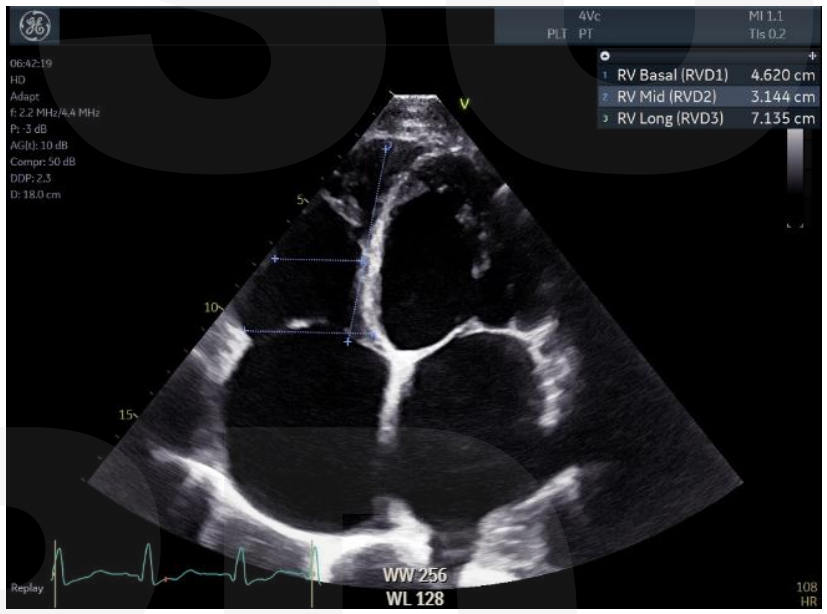
69 y/o man w/ COPD presenting with AF/RVR and respiratory failure



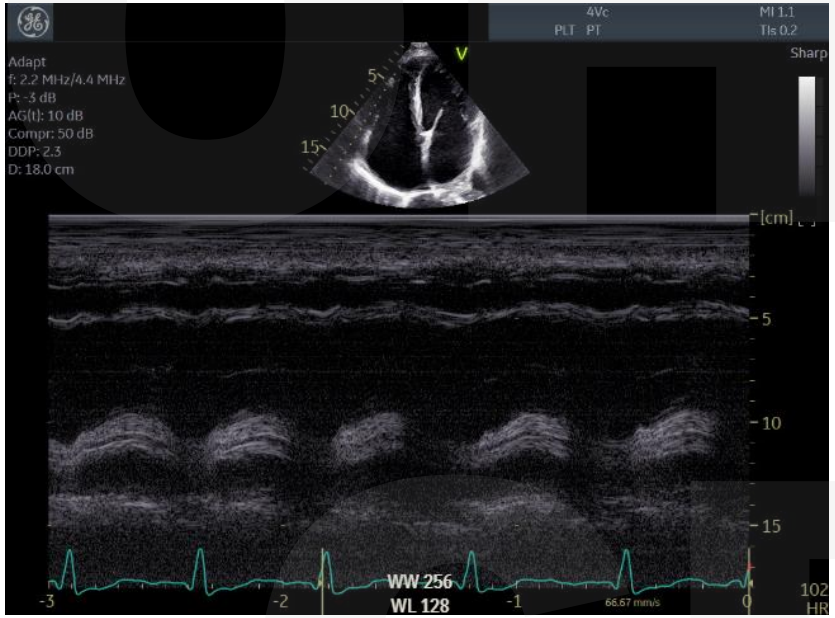


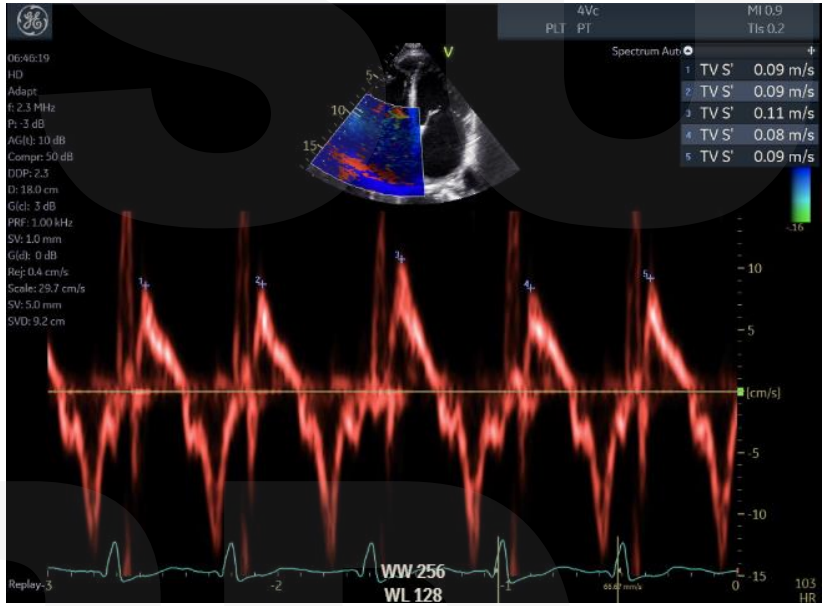
RA and RV size





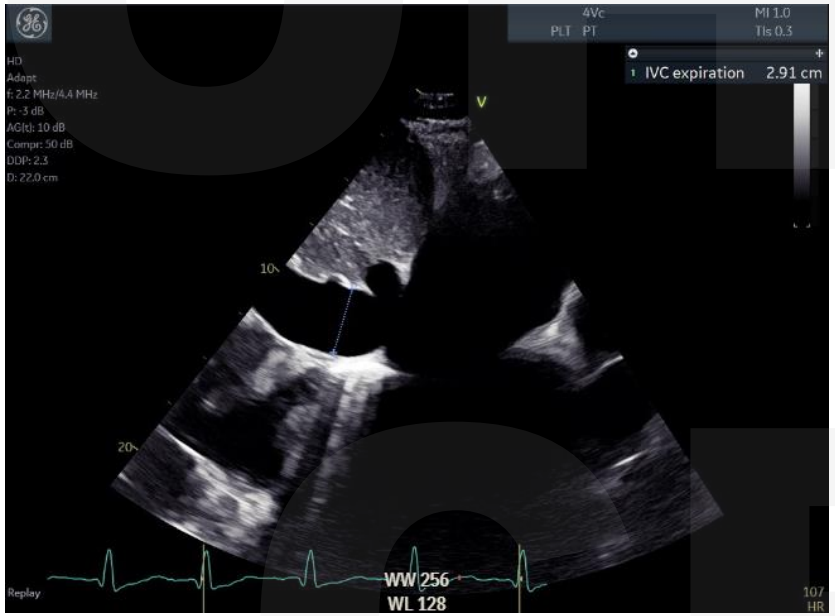
TAPSE & RV S’



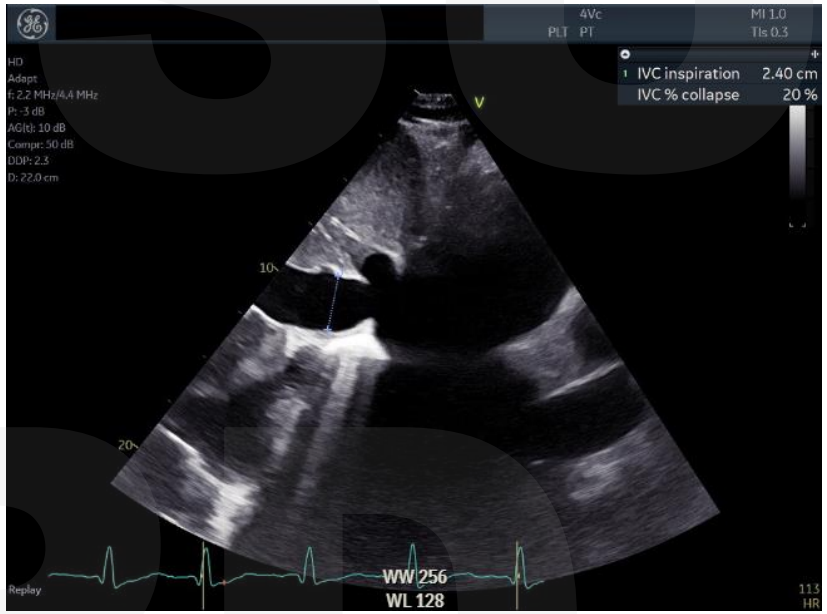


Measure	Patient	Normal	Mild	Moderate	Severe
TAPSE	?	>1.7	1.7-1.3	<1.3-1.1	<1.1
RV S’	9.2 cm/s	>9.5	9.5-7.2	<72-5.1	<5.0

Right atrial pressure



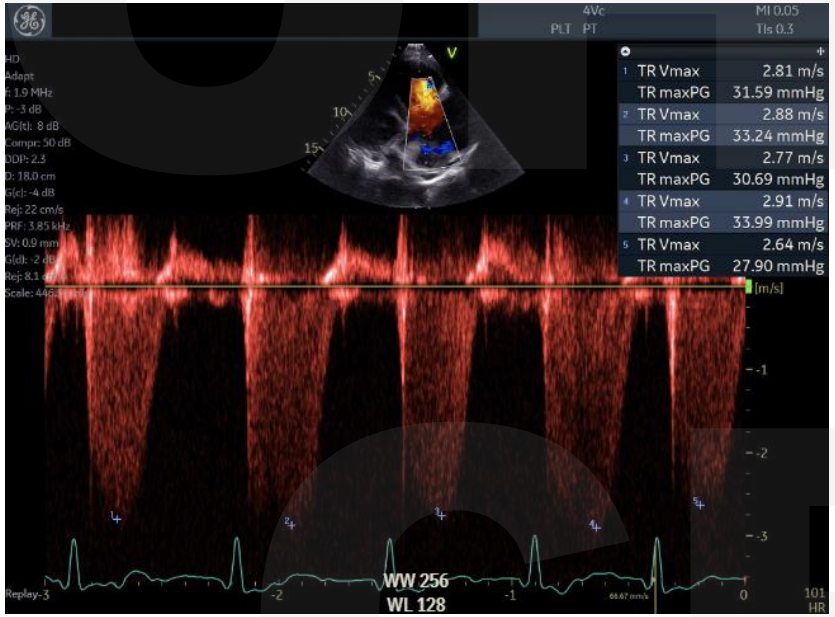
IVCd >25 mm



<50% collapse

RAP = 20

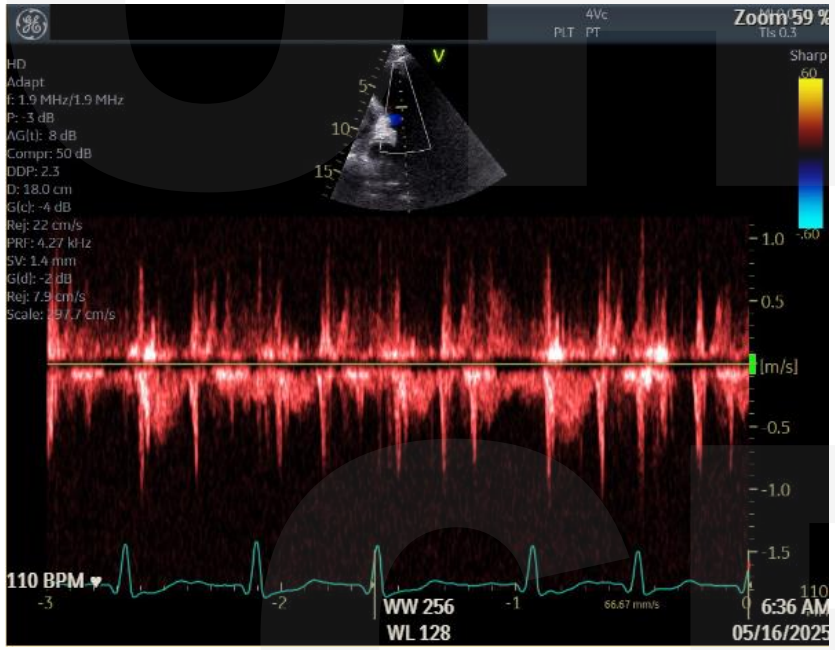
RVSP + mPAP

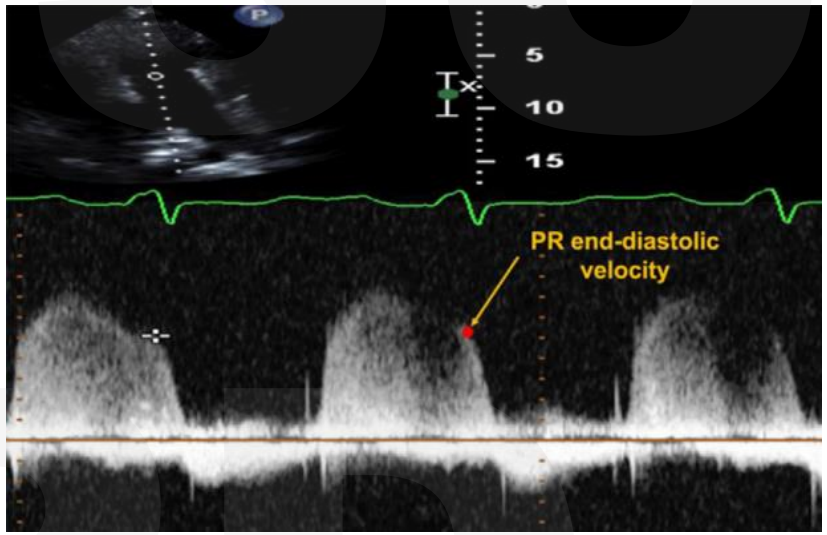


- RVSP = RAP + TRmax PG
- RVSP = 20 + 32
- RVSP = 52 mmHg

- mPAP = (RVSP * 0.61) + 2
- mPAP = (52 * 0.61) +2
- mPAP = 34

PAEDP


Zoom 59 %
HD
Adapt
f: 1.9 MHz/1.9 MHz
P: -3 dB
AG(t): 8 dB
Compr: 50 dB
DDP: 2.3
D: 18.0 cm
G(c): -4 dB
Rej: 22 cm/s
PRF: 4.27 kHz
SV: 1.4 mm
G(d): -2 dB
Rej: 7.9 cm/s
Sharp
1.0
0.5
[m/s]
-0.5
-1.0
-1.5
110 BPM
WW 256
WL 128
6:36 AM
05/16/2025


PR end-diastolic velocity

Future Topics

1. Valvular Heart Disease
2. Syncope
3. Hypertension
4. Peri-operative Medicine
5. Vascular Disease