What Are My Treatment Options for AF?

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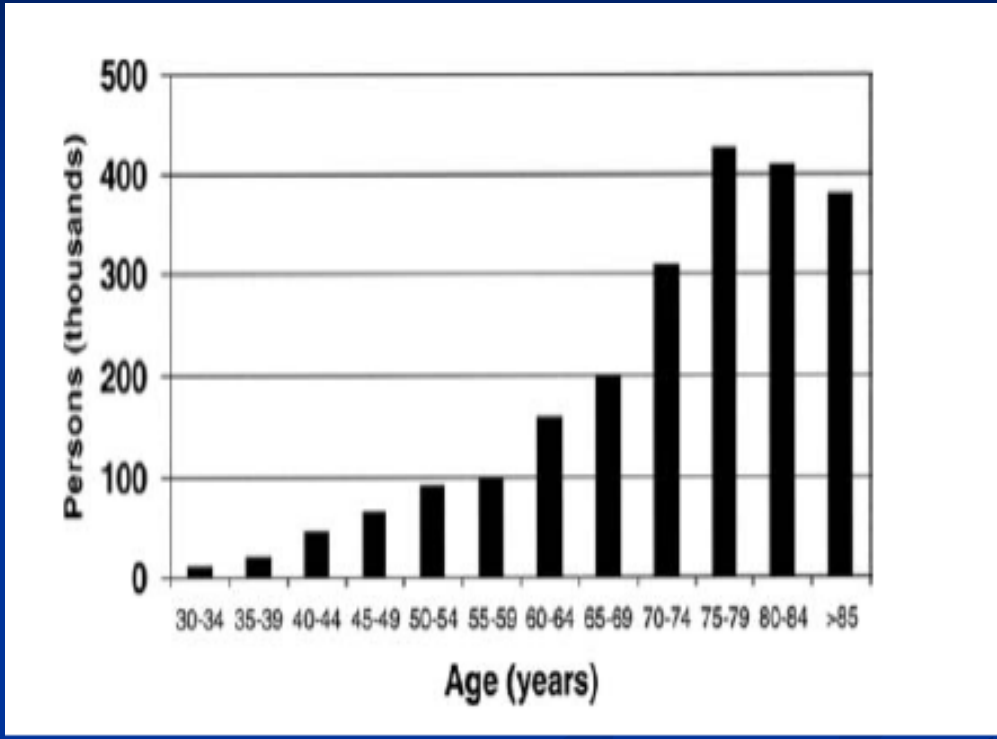
Atrial Fibrillation (AF, Afib)

- Epidemiology of AF
- Treatment Options for AF

Epidemiology

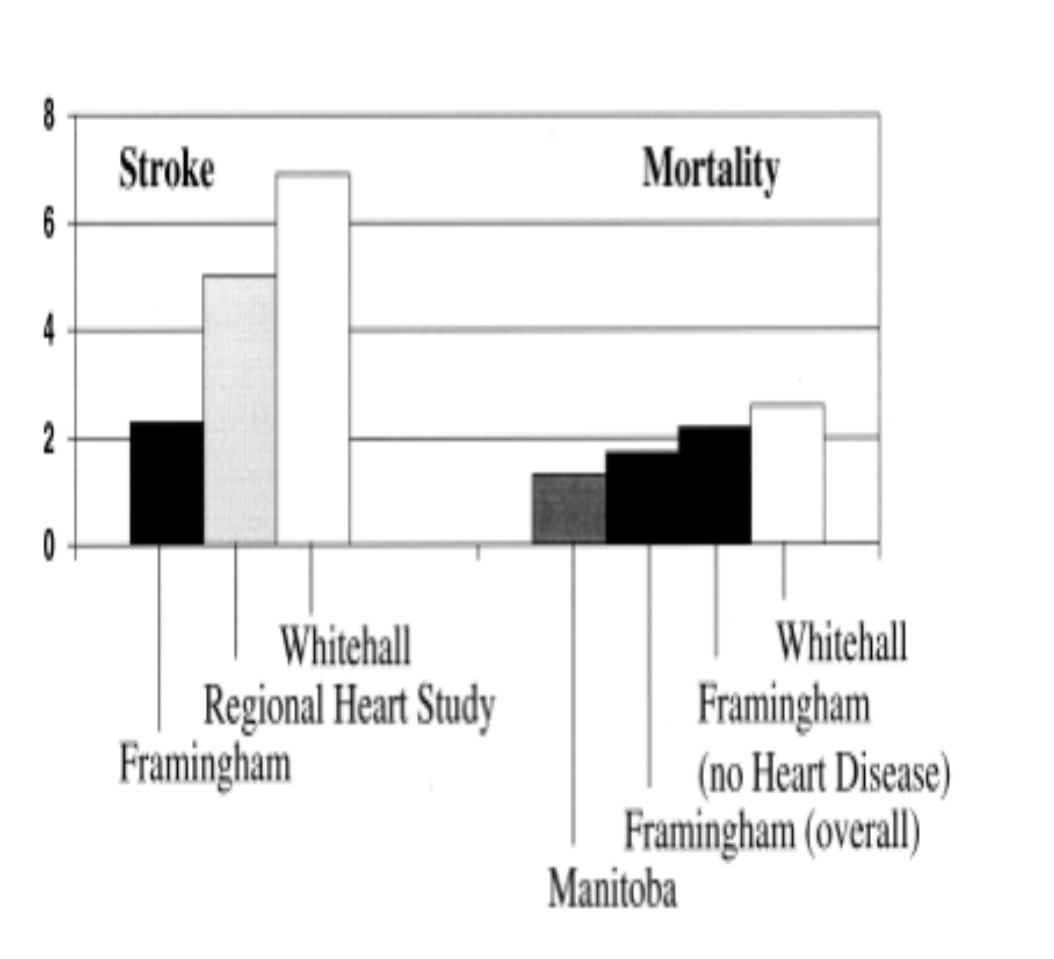
- Estimated 6 million people in U.S. with AF
- 15.9 million by 2050
- A 66% increase in hospital admissions for AF in last 20 yrs
  - Aging population
  - Increase in obesity and sleep apnea
  - Rising prevalence of chronic heart disease



Feinberg WM et al. *Arch Intern Med.* 1995;155:469-473
Holmes DR et.al. Lancet 2009

AF is Associated with Higher Stroke and Mortality Rate

- Two fold
- Five fold



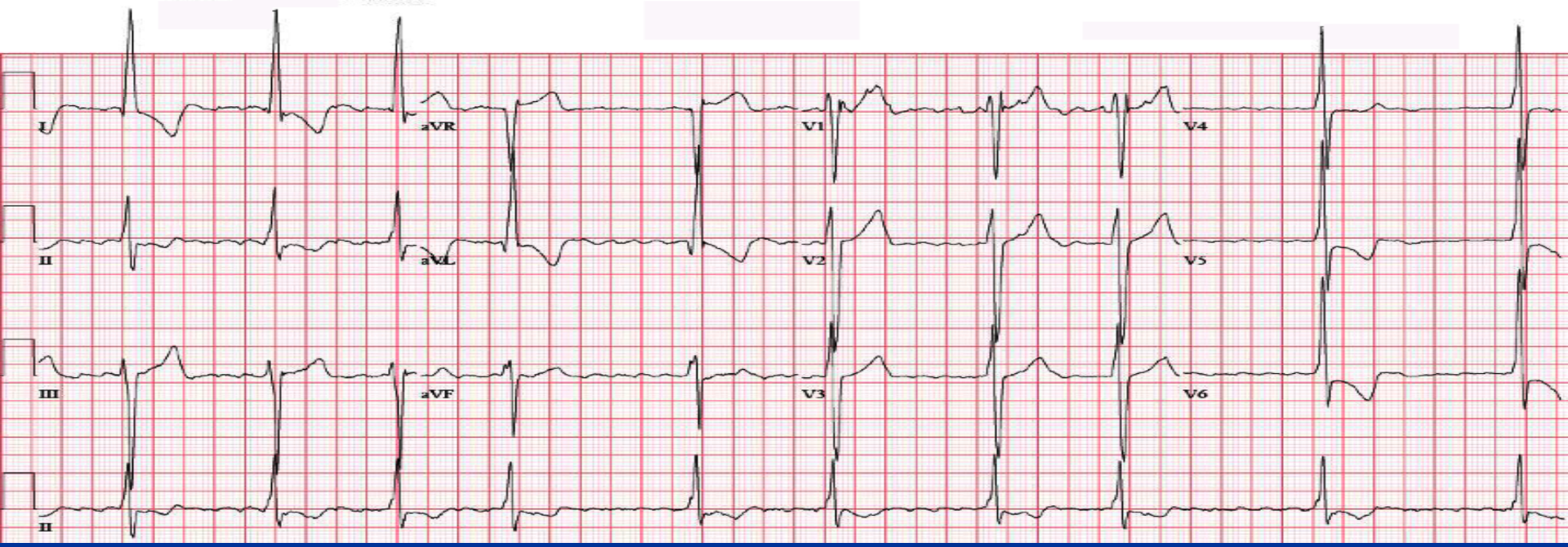
Treatment of AF

- Treating symptoms
  a.Rhythm control
  b.Rate control

- Reducing stroke risk (morbidity and mortality)

Treating Symptoms

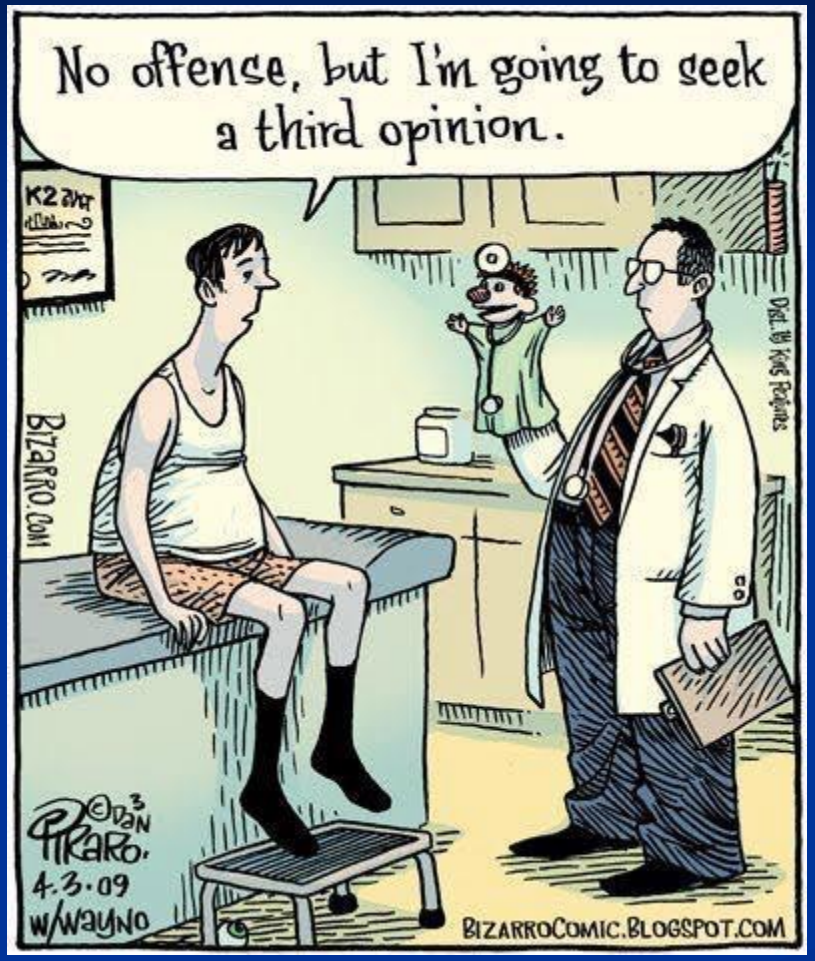
- 72 yo man referred by his PCP for a second opinion regarding AF treatment. He denied shortness of breath fatigue chest pain. He continue to walk 2 miles per day and has no limitation. He has known AF for 2 years. He is on coumadin, amlodipine and metoprolol



How Would you Treat this Patient?

- Ablation
- Cardioversion
- Antiarrhythmic Drugs
- No treatment

How Would you Treat this Patient?



- NO TREATMENT
- If AF is asymptomatic
- NO INVASIVE PROCEDURE IS NEEDED IN THE MAJORITY OF CASES

Case-2: Treatment

- Mrs CA is a 65 yo female fairly active has history of hypertension and diabetes. Was diagnosed with AF 2 years ago . She has been having increasing episode of AF lasting 3-24 hrs and occurring on a weekly basis. During those episodes she feels "wiped out", she can't perform her usual tasks without shortness of breath and easy fatiguability. She is on the following meds:

Metoprolol 50 mg Pradaxa 150 mg

Lisinopril 20 mg

How Would you Treat this Patient?

- Ablation
- Cardioversion
- Antiarrhythmic Drugs
- No treatment

Symptomatic AF

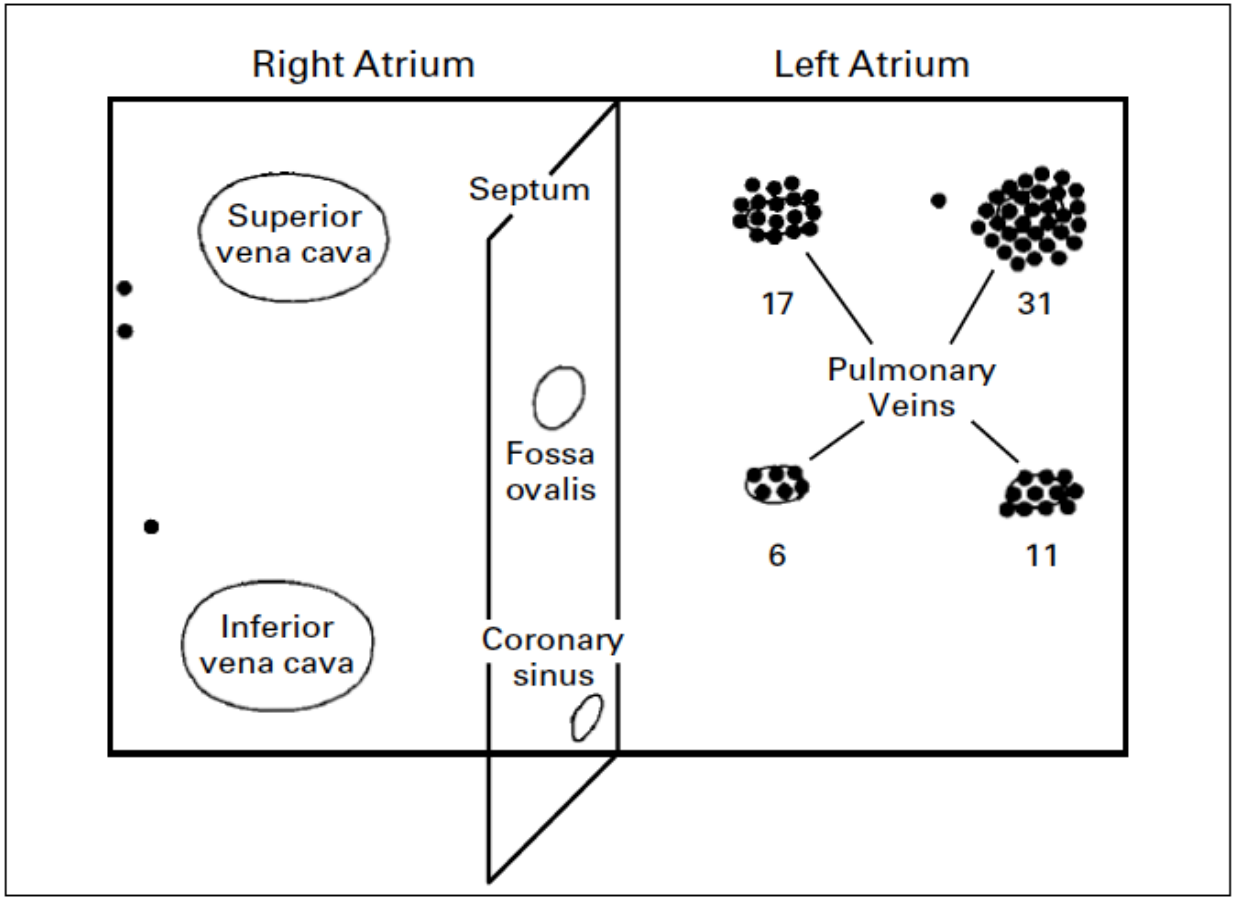
- Prevent its occurrence
- Antiarrhythmic drugs:
  - Flecainide
  - Propafenone
  - Sotalol
  - Tikosyn
  - Amiodaorne

Case-3

- Mrs CA was started on flecainide 100 mg twice a day, she did great for 1 year but presents back with recurrence of AF and significant symptoms. Her symptoms are occuring almost weekly and her longest episode was 12 hours.

How Would you Treat this Patient?

- Ablation
- A different Antiarhythmic
- Pacemaker
- No treatment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Left Atrium
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Superior vena cava
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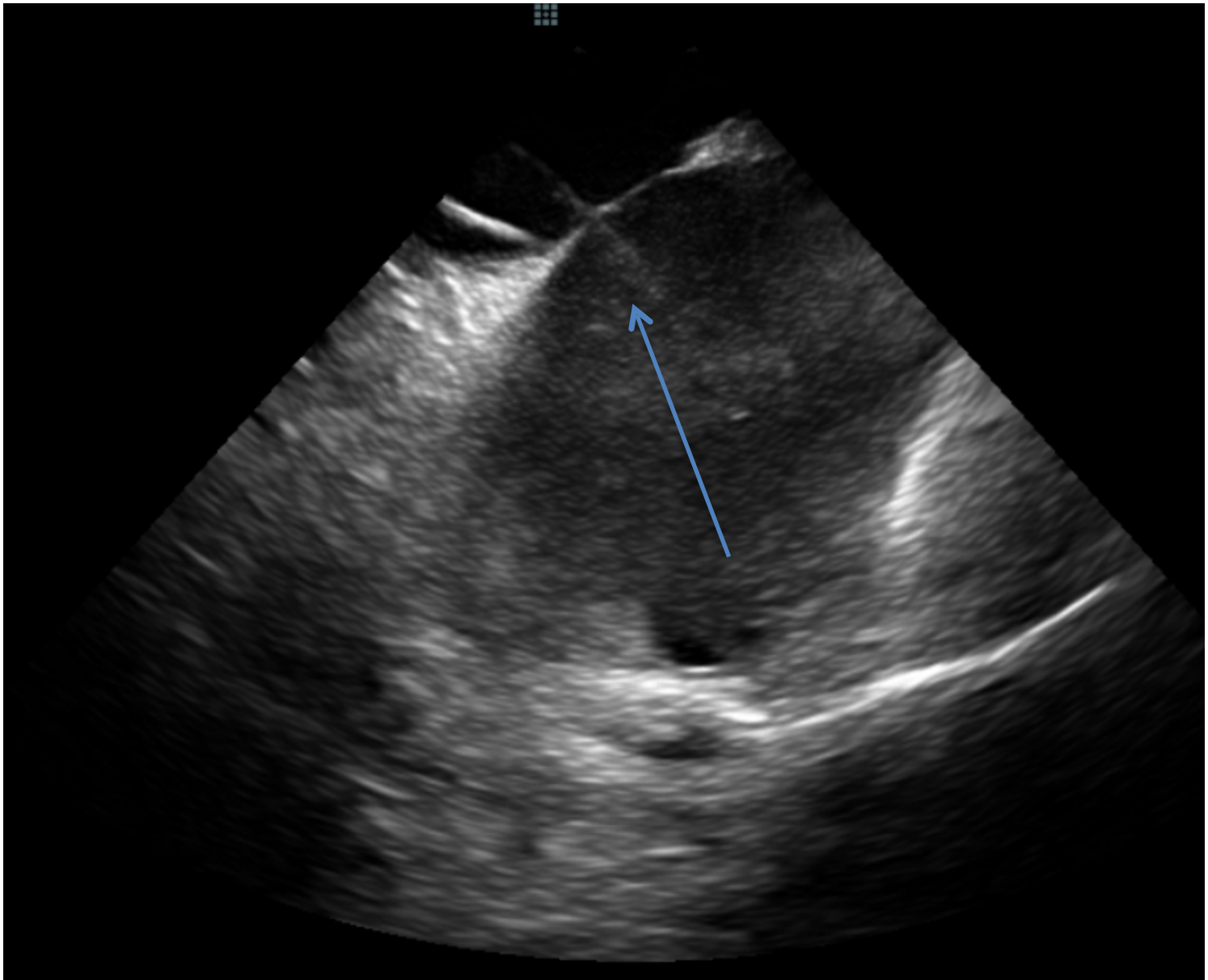
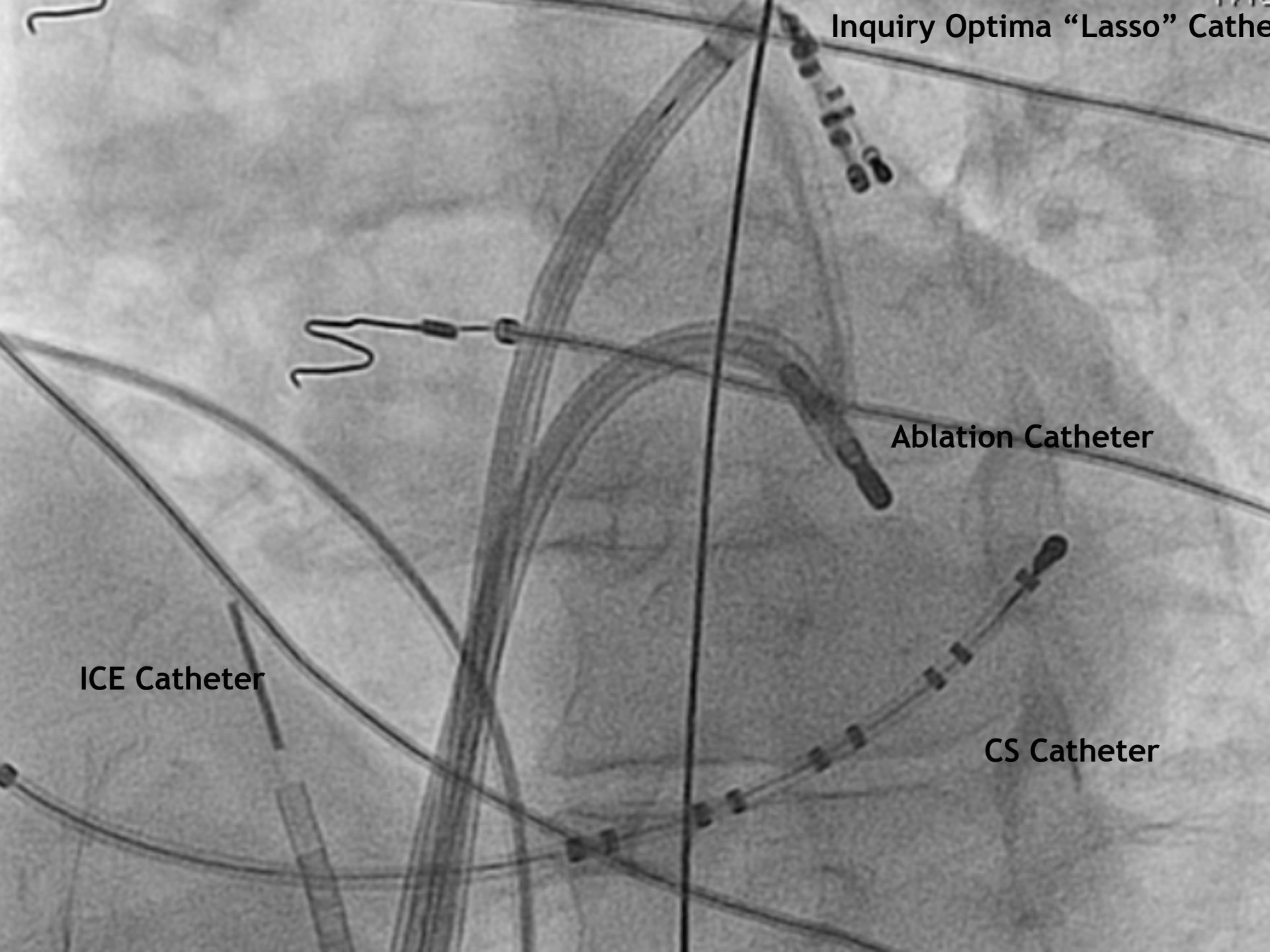
31
Pulmonary Veins
Fossa ovalis
6
11
Inferior vena cava
Coronary sinus

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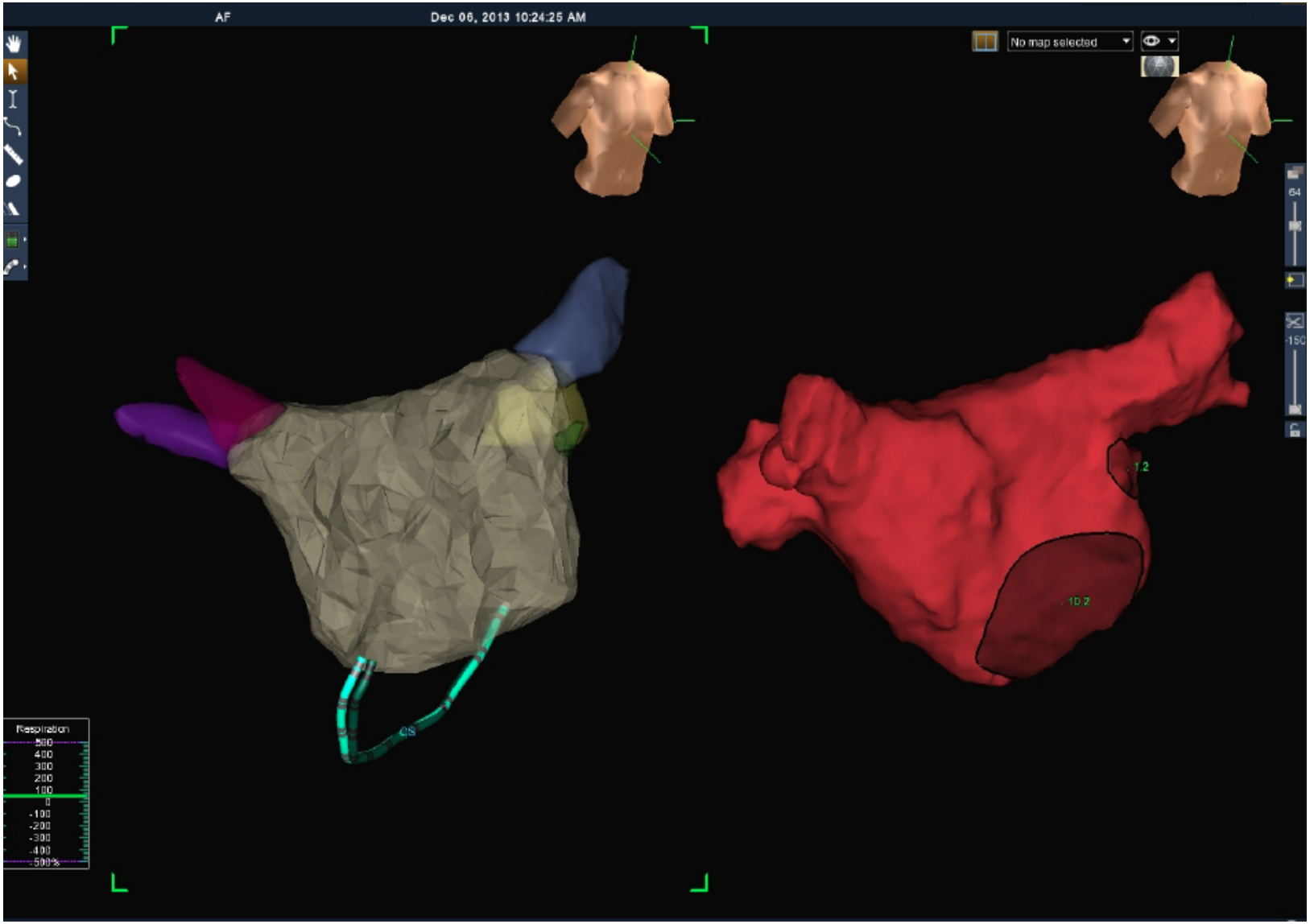
Ablation Catheter
ICE Catheter
CS Catheter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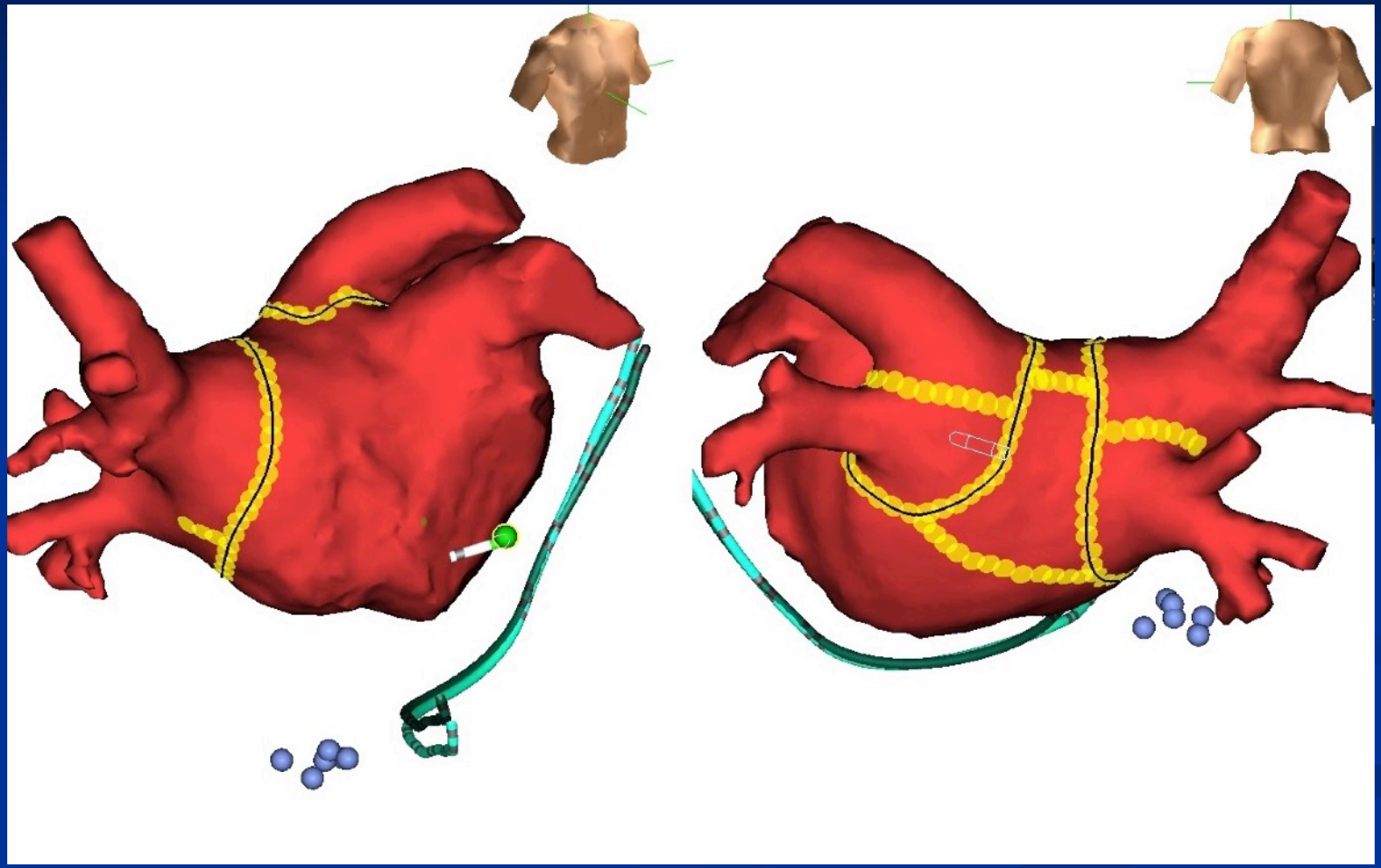
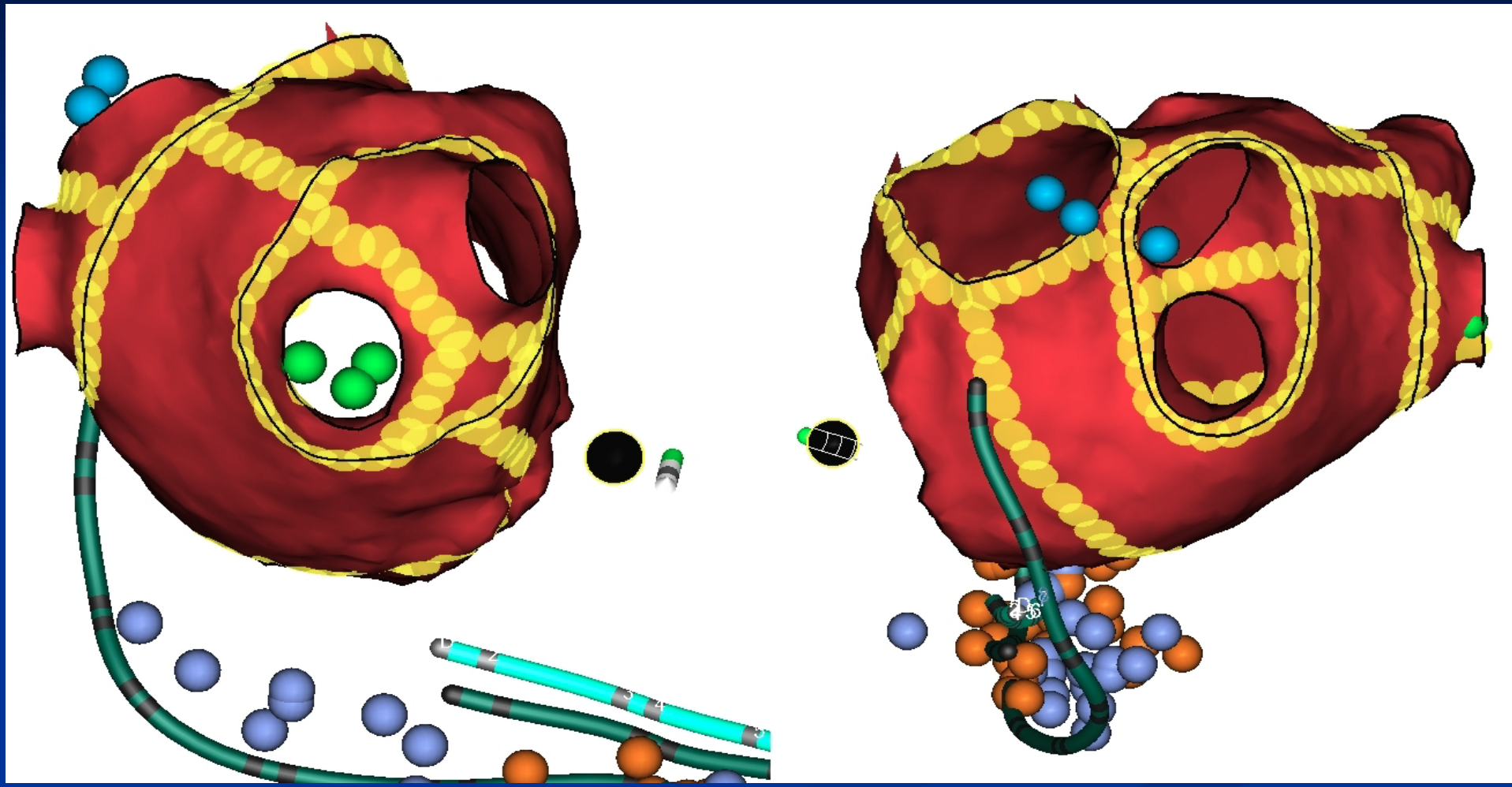
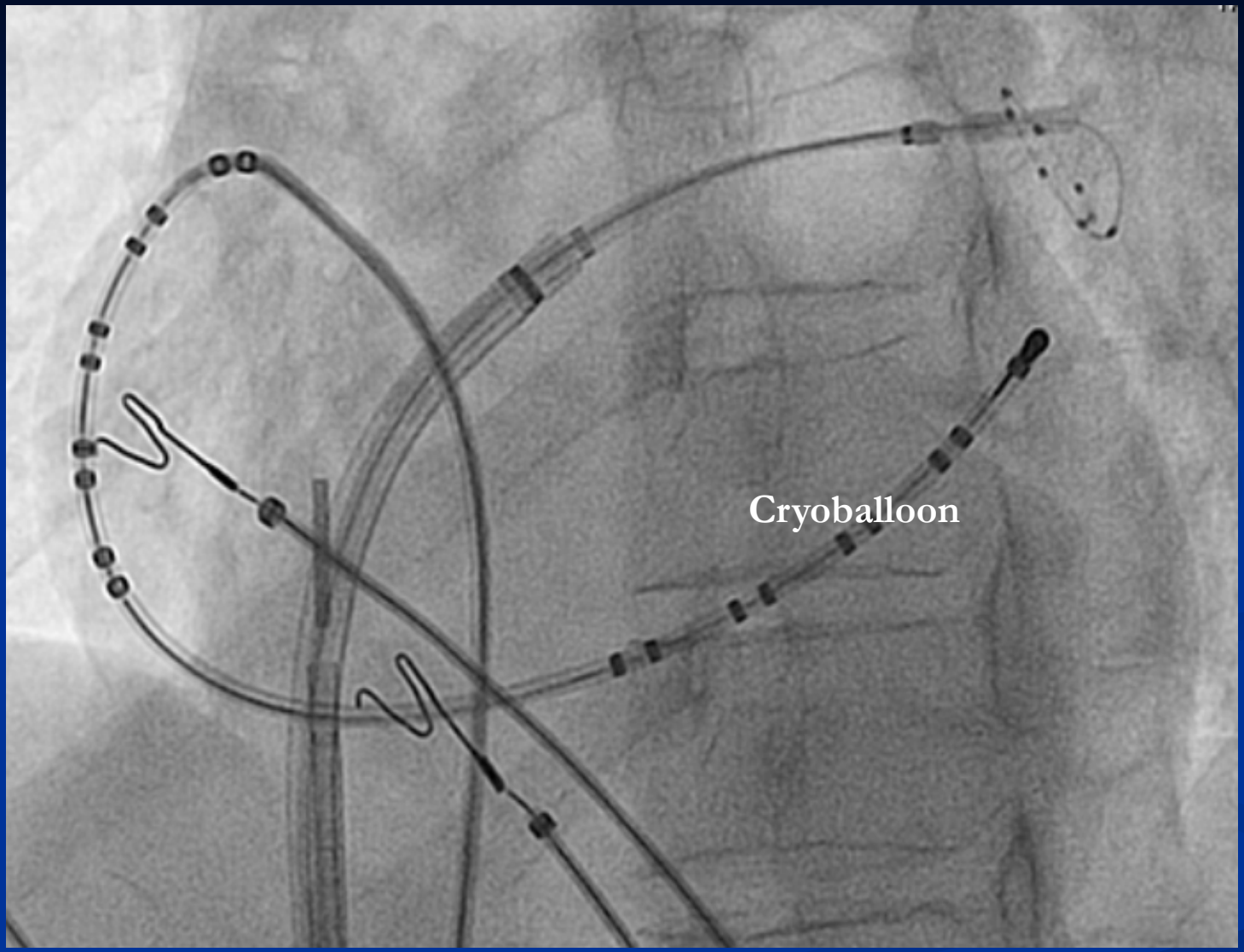





Cryoballoon

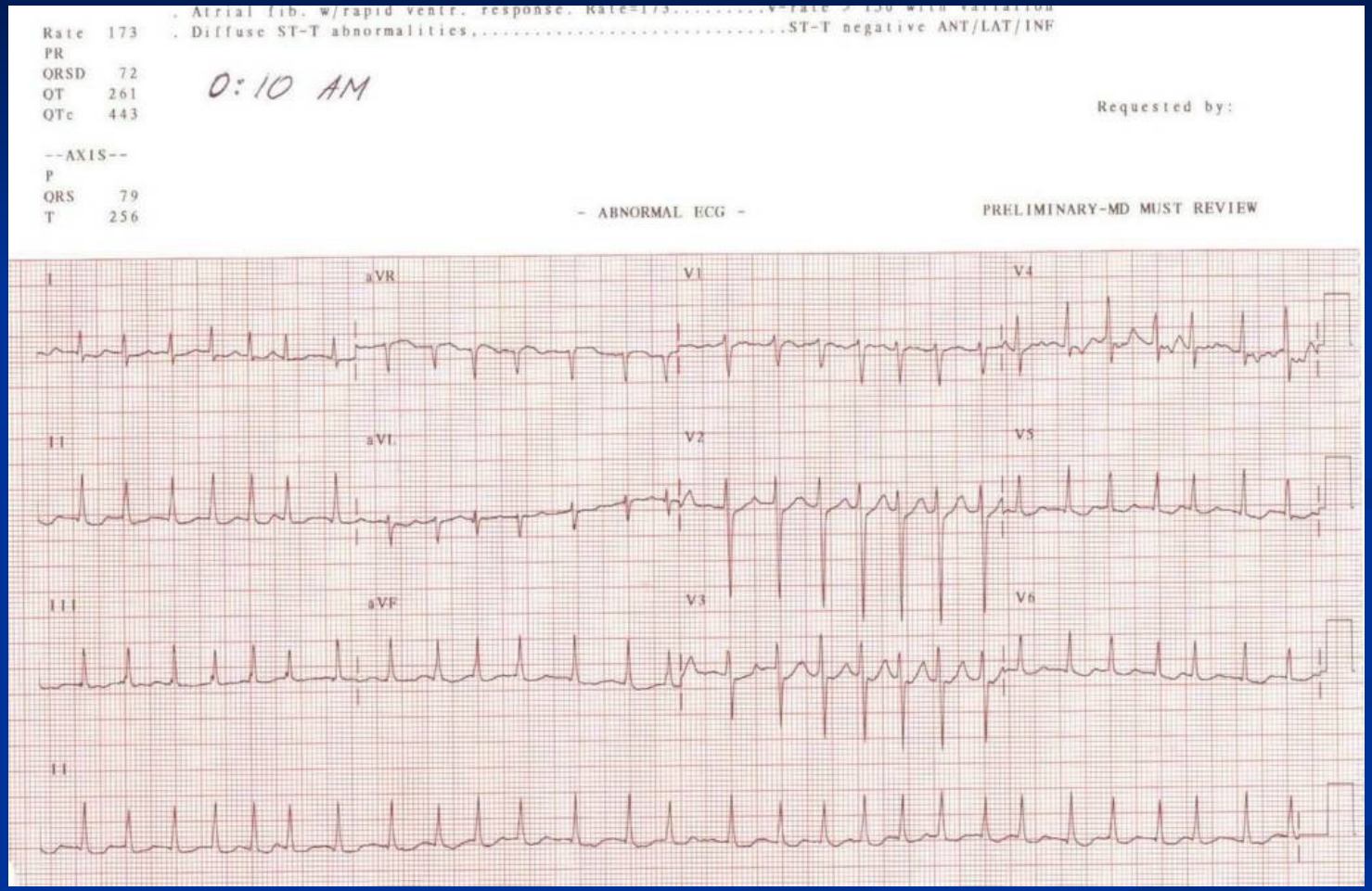
Case-4

- Mrs CA's ablation worked and she is happy with me so she brings her aunt who has atrial fibrillation to see if her Aunt can get an ablation.
- Her Aunt is 85. She has AF that is very symptomatic and is associated with rapid rates. She has been in the ER 3 times in the last 6 months despite being on Amiodarone.

How Would you Treat this Patient?

- Ablation
- Pacemaker and AV node ablation
- Change medications

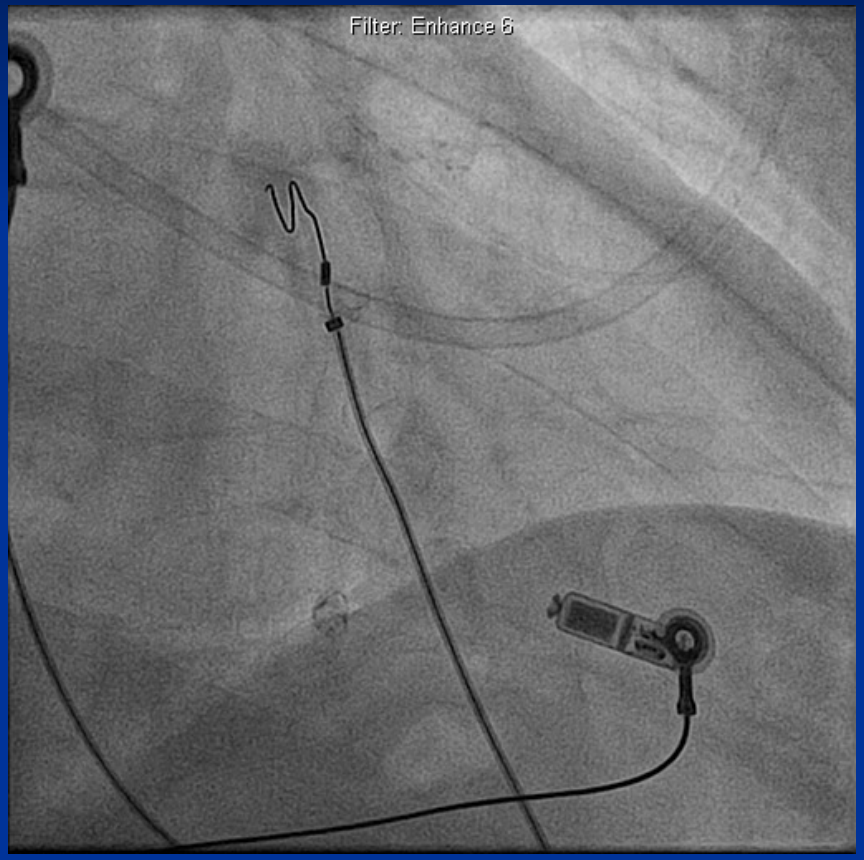
Pre-Ablate and Pace Approach

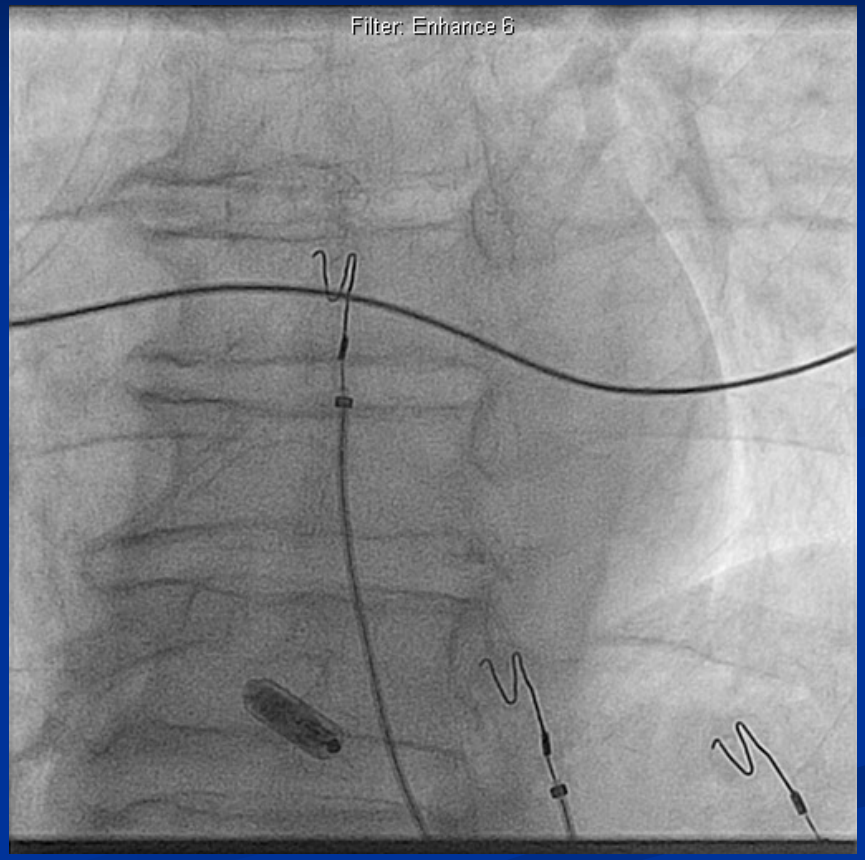


Post-Ablate and Pace Approach

2 Kinds of Pacemakers

Micra Pacemaker





Stroke Prevention

- Five Fold increased risk of stroke
- A stroke in the setting of AF is typically a larger stroke

The $CHADS_2$ Index

Stroke Risk Score for AF

	Score (points)	Prevalence (%)
CHF	1	32
HTN	1	65
Age >75 years	1	28
Diabetes mellitus	1	18
Stroke or TIA	2	10
High risk	≥3	22
Moderate risk	1-2	33-50
Low risk	0-1	18-51

Gage BF et al. *JAMA*. 2001;285: 2864-2870.
Van Walraven C et al. *Arch Intern Med*. 2003;163:936-934.
Nieuwlaat R et al. *Eur Heart J*. 2006;27:3018-3026.

CHADS2 Score and Stroke Rate off Anticoagulants or Antiplatelets

$CHADS_2$ score	Patients (n = 1733)	Adjusted stroke rate (%/year)[a] (95% confidence interval)
0	120	1.9 (1.2–3.0)
1	463	2.8 (2.0–3.8)
2	523	4.0 (3.1–5.1)
3	337	5.9 (4.6–7.3)
4	220	8.5 (6.3–11.1)
5	65	12.5 (8.2–17.5)
6	5	18.2 (10.5–27.4)

Gage BF, JAMA 2001

CHA_2DS_2VASc Score and Stroke Rate

Risk factors for stroke and thrombo-embolism in non-valvular AF (Atrial Fibrillation)
Major Risk Factors
Previous stroke, TIA (transient ischemic attack) or systemic embolism at ≥ 75 years
Clinically relevant non-major risk factors
Heart Failure or moderate to severe LV (Left ventricular) systolic dysfunction (e.g., LV EF≤ 40%) Hypertension – Diabetes mellitus Female sex – age 65-74 years Vascular disease [1]

[1] Prior myocardial infarction, peripheral artery disease. Aortic plaque. Actual Rates of stroke in contemporary cohorts may vary from these estimates.

[2]Maximum score is 9 since age may contribute 0, 1, or 2 points.

EF = Ejection fraction (as documented by echocardiography, radionuclide, ventriculography, cardiac catheterization, cardiac magnetic resonance imaging, etc.)

Risk factor-based approach expressed as a point based scoring system, with the acronym CHA_2DS_2VASc

Risk Factor	Score
Congestive Heart Failure/LV dysfunction	1
Hypertension	1
Age ≥75 years	2
Diabetes mellitus	1
Stroke, TIA or thrombo-embolism	2
Vascular disease [1]	1
Age 65-74	1
Sex category (female sex)	1
Maximum Score	**9**

Adapted from: Camm AJ et al. *Eur Heart J.* 2010 Aug 29. [Epub ahead of print]

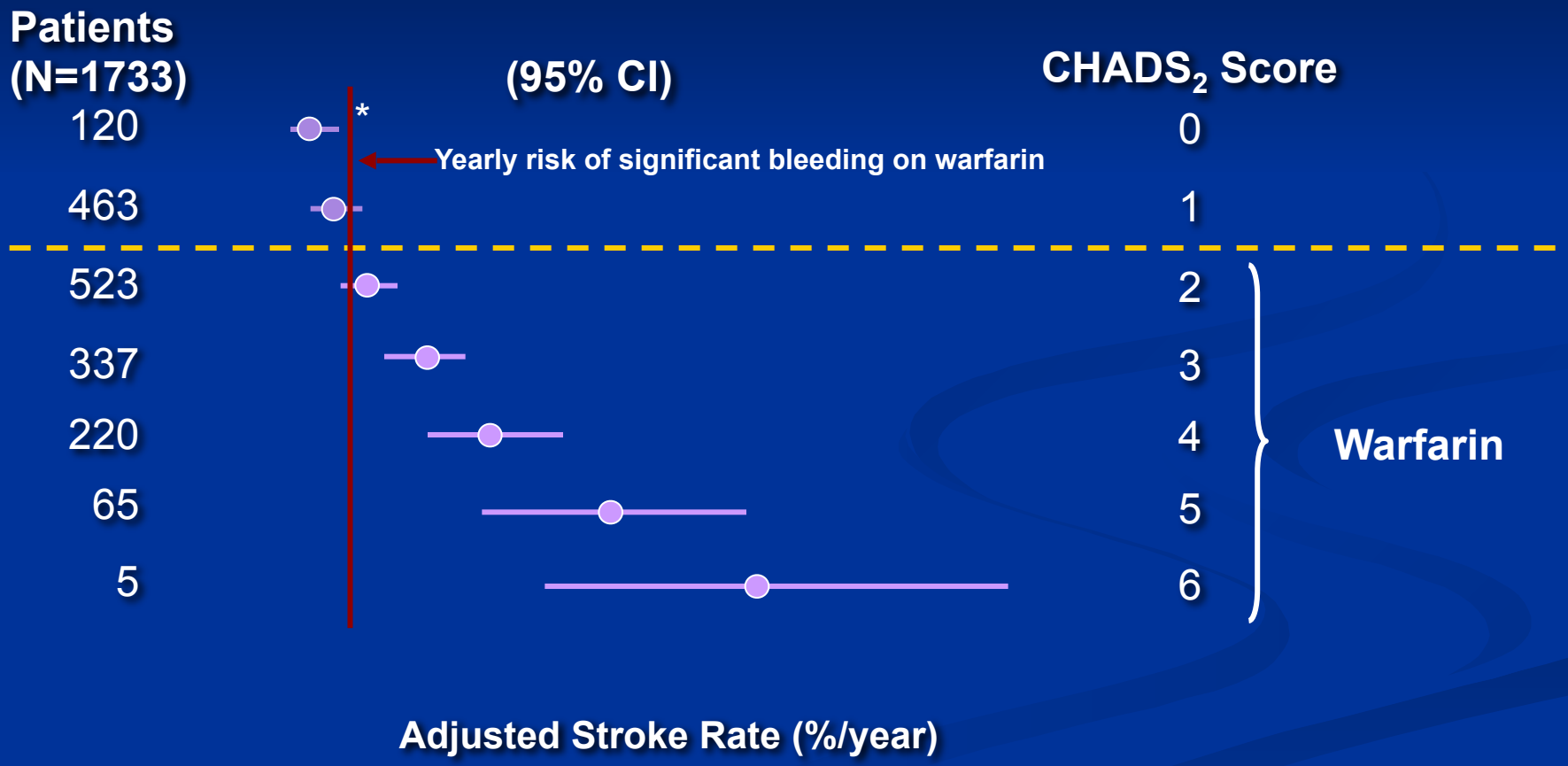
CHA_2DS_2VASc Score and Stroke Rate

Adjusted Stroke Rate according to CHA_2DS_2VACc Score		
CHA_2DS_2VASc Score	Patients (n=7329)	Adjusted Stroke Rate (%/year)[1]
0	1	0%
1	422	1.3%
2	1230	2.2%
3	1730	3.2%
4	1718	4.0%
5	1159	6.7%
6	679	9.8%
7	294	9.6%
8	82	6.7%
9	14	15.2%

[1] Based on Lip et al. *BMJ.* 2000; 320:104 .

Adapted from: Camm AJ et al. *Eur Heart J.* 2010 Aug 29. [Epub ahead of print]

Stroke Risk in Patients With Nonvalvular AF Not Treated With Anticoagulation According to the $CHADS_2$ Index



*The yearly rate of 3.3%/yr is a weighted estimate from pooling of several trials where the actual incidence of major bleeding varied from <1%/yr to >6%/yr.

Slide courtesy of J. Reiffel, MD

Fuster V et al. *Circulation*. 2006;114:e257-e354.

When is Warfarin Indicated?

Risk category	CHA_2DS_2-VASc score	Recommended antithrombotic therapy
One 'major' risk factor or ≥2 'clinically relevant non-major' risk factors	≥ 2	OAC[a]
One 'clinically relevant non-major' risk factor	1	Either OAC[a] or aspirin 75–325 mg daily. Preferred: OAC rather than aspirin.
No risk factors	0	Either aspirin 75–325 mg daily or no antithrombotic therapy. Preferred: no antithrombotic therapy rather than aspirin.

Anticoagulation for Nonvalvular AF

Pooled data from AFASAK, SPAF, and BAATAF

For every 1000 patients with nonvalvular AF in clinical trials treated with warfarin for 1 year:

Benefit

31 fewer thromboembolic events*

Risk

1 more intracranial or major bleed*

*Compared with control
35 more minor bleeds occurred with warfarin
Intention-to-treat analysis

Adapted from Albers GW et al. Ann Neurol. 1991;30:511-8

4 FDA Approved Drugs in 5 Years

- Dabigatran- Pradaxa- Oct 19, 2010
- Rivaroxaban- Xarelto- Nov 4, 2011
- Apixaban-Eliquis- December 28, 2012
- Edoxaban-Savaysa- January 8 2015

Comparing the New AC

	Dabigatran	Rivaroxaban	Apixaban	Edoxaban
Stroke	⇓	⇔ (trend)	⇓	⇔ (trend)
Ischemic Stroke	⇓	⇔	⇔	⇔
Bleeding	⇔	⇔	⇓	⇓
Mortality	⇔ (trend)	⇔ (trend)	⇓	⇔ (trend)

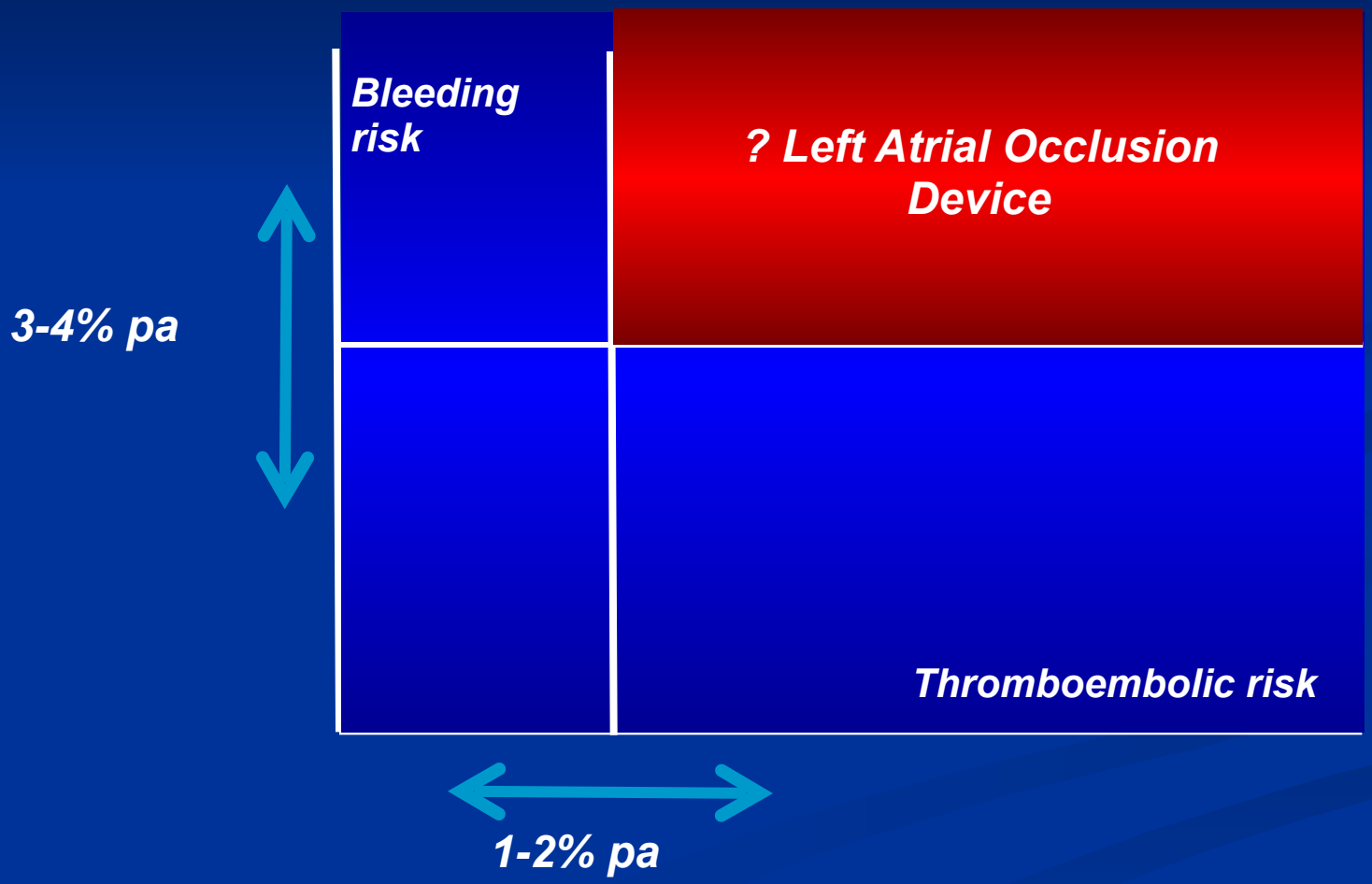
What Drug to Choose?

	Best Choice	Bleeding Risk	Non-Compliant	Recurrent TIA	CRF	Valvular AF
Warfarin					X	X
Pradaxa				X		
Rivaroxaban			X			
Apixaban	X	X				
Edoxaban		X	X			

New Anticoagulants

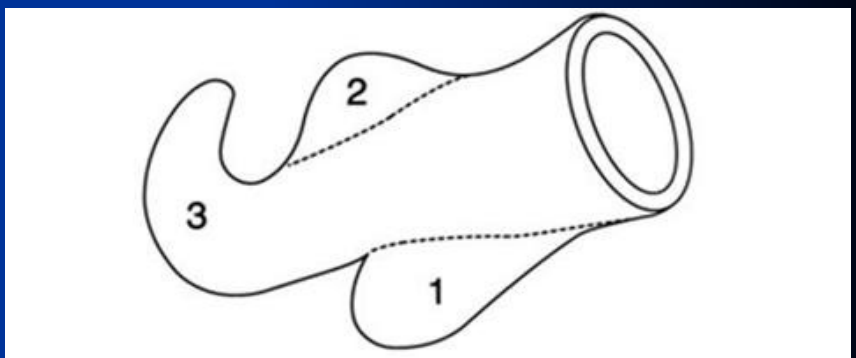
- Favorable balance between efficacy and safety compared to warfarin
- At least as effective as warfarin for stroke prevention
- **Common denominator: Lower risk of ICH**
- Apixaban reduces mortality compared to warfarin and as importantly its safety profile appears excellent (as safe as ASA)
- Reversibility and cost the only downside

Thromboembolism versus Haemorrhage



LAA site of Thrombus Formation

- Stagnation within the long ended trabeculated pouch (cul-de-sac)
- Creates an appropriate milieu for stasis and thrombus formation
- 90% of all clots in non-rheumatic AF patients are found in the LAA (autopsy and TEE studies)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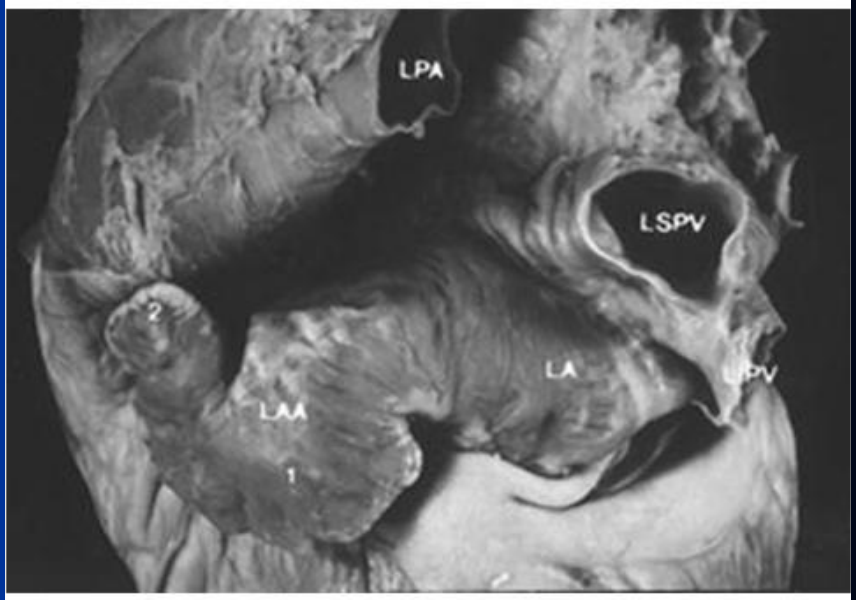
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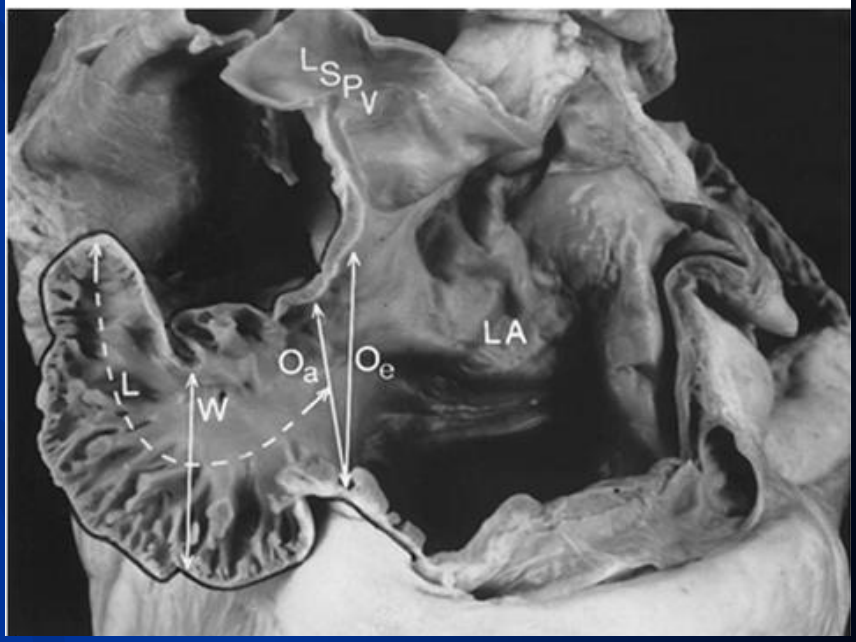
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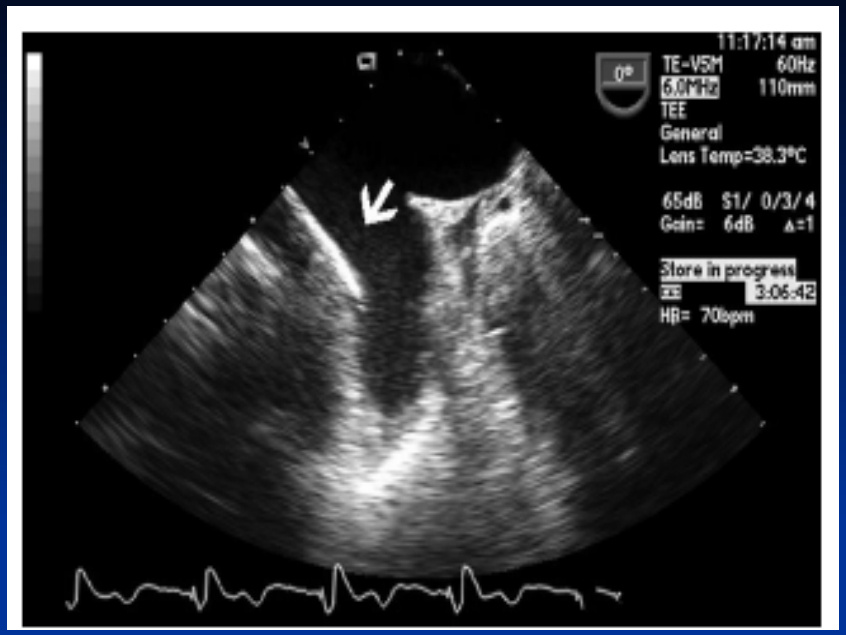
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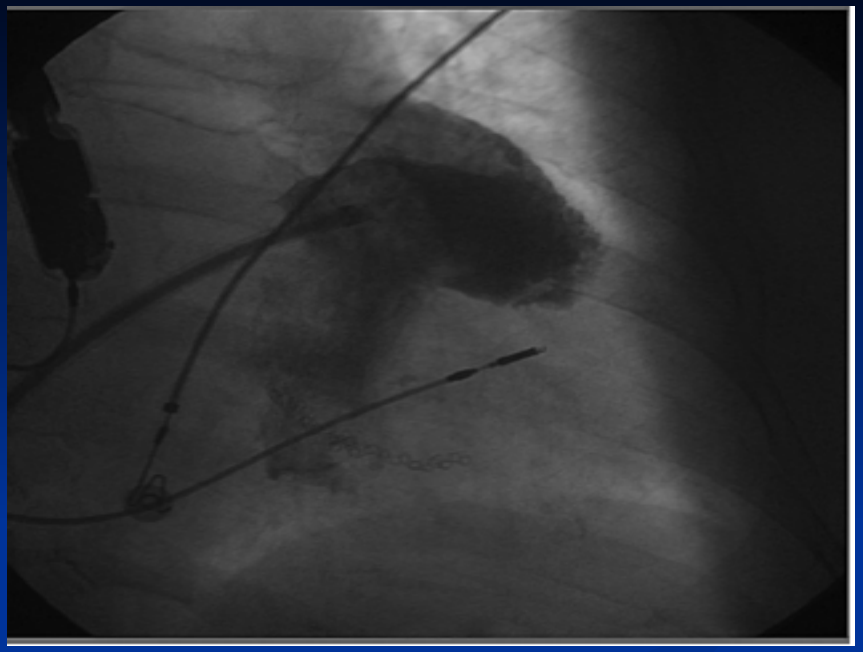

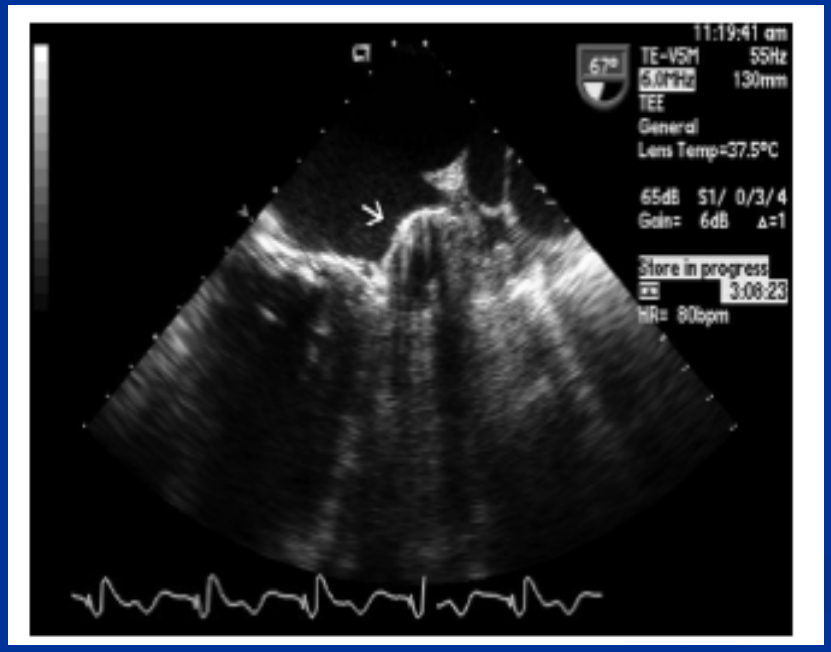
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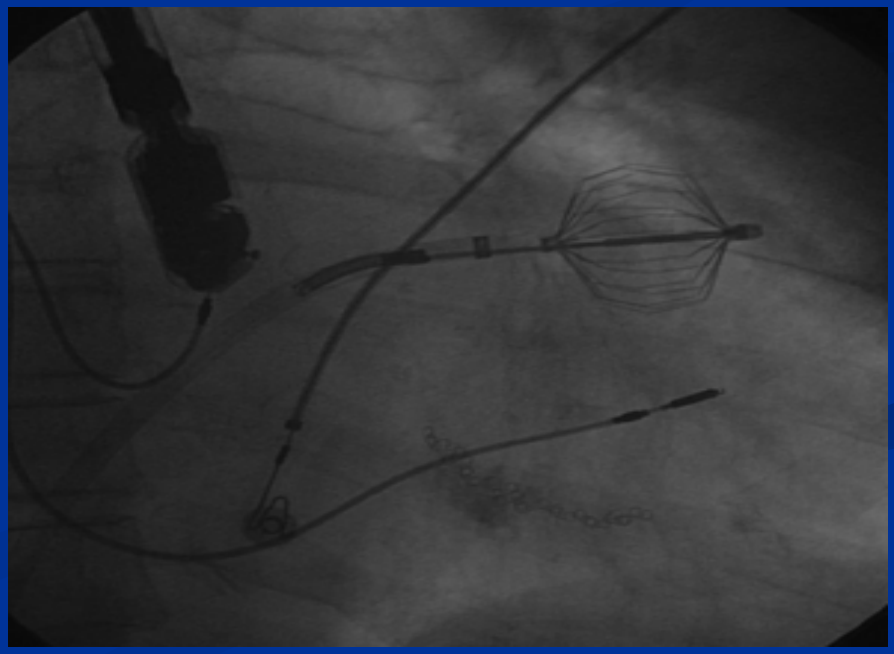
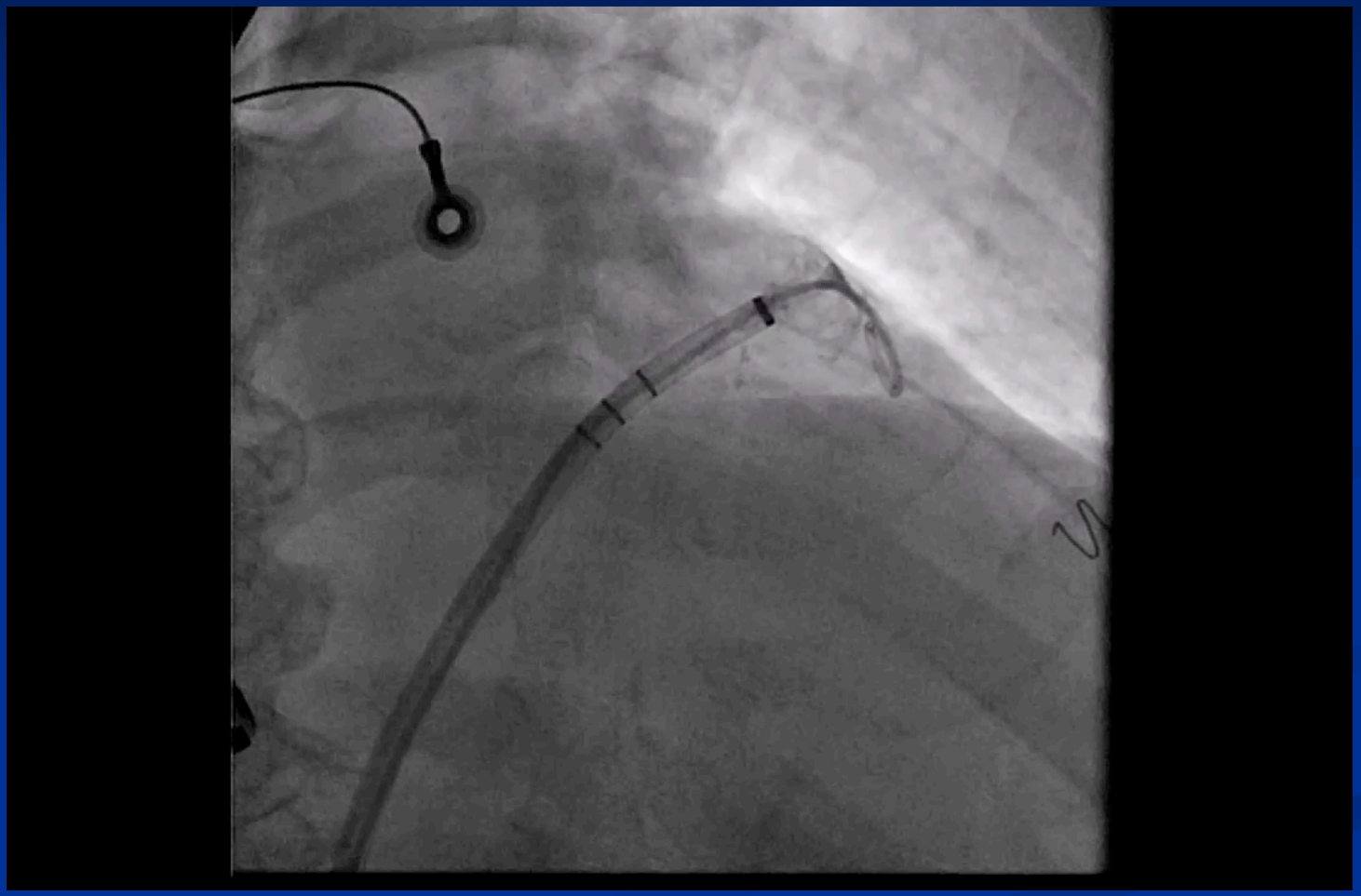
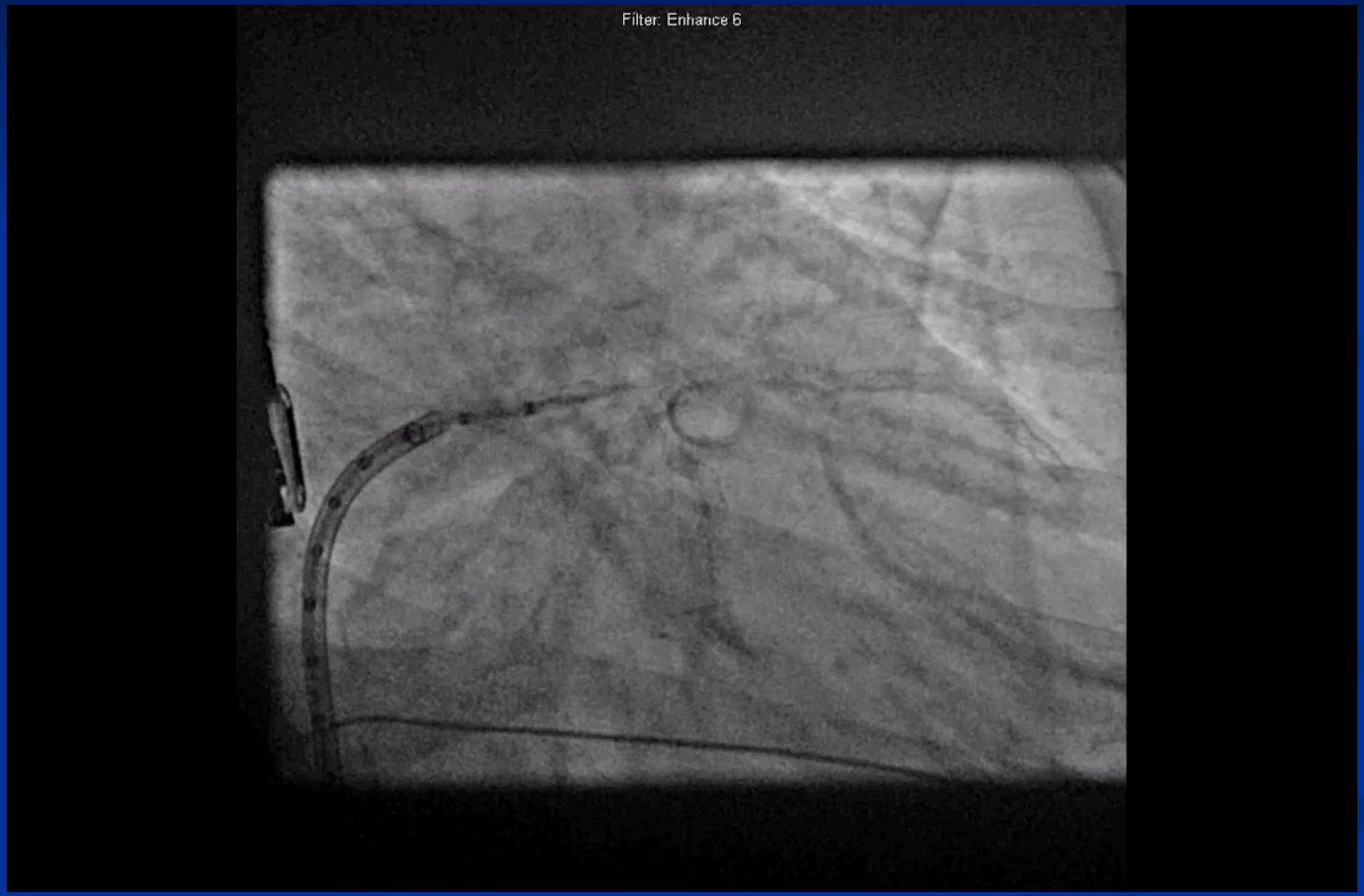


Deep in the Appendage

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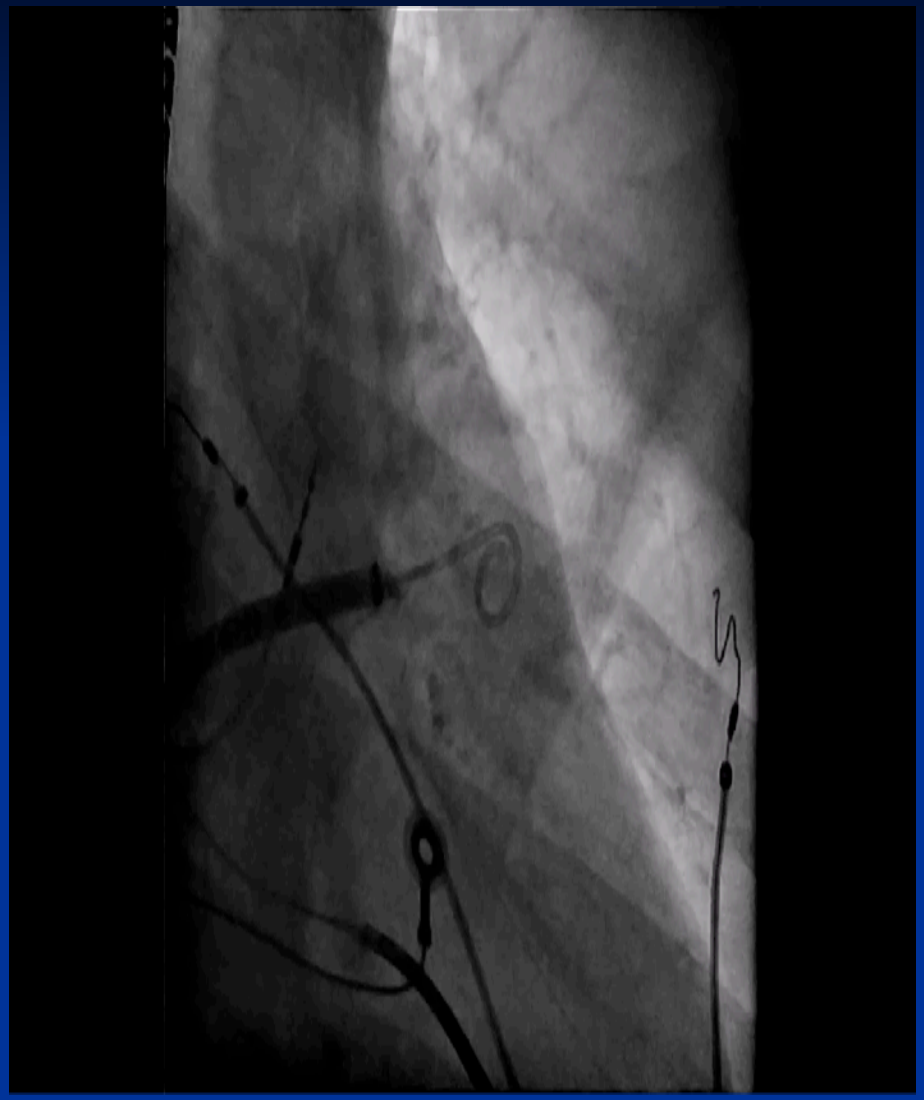
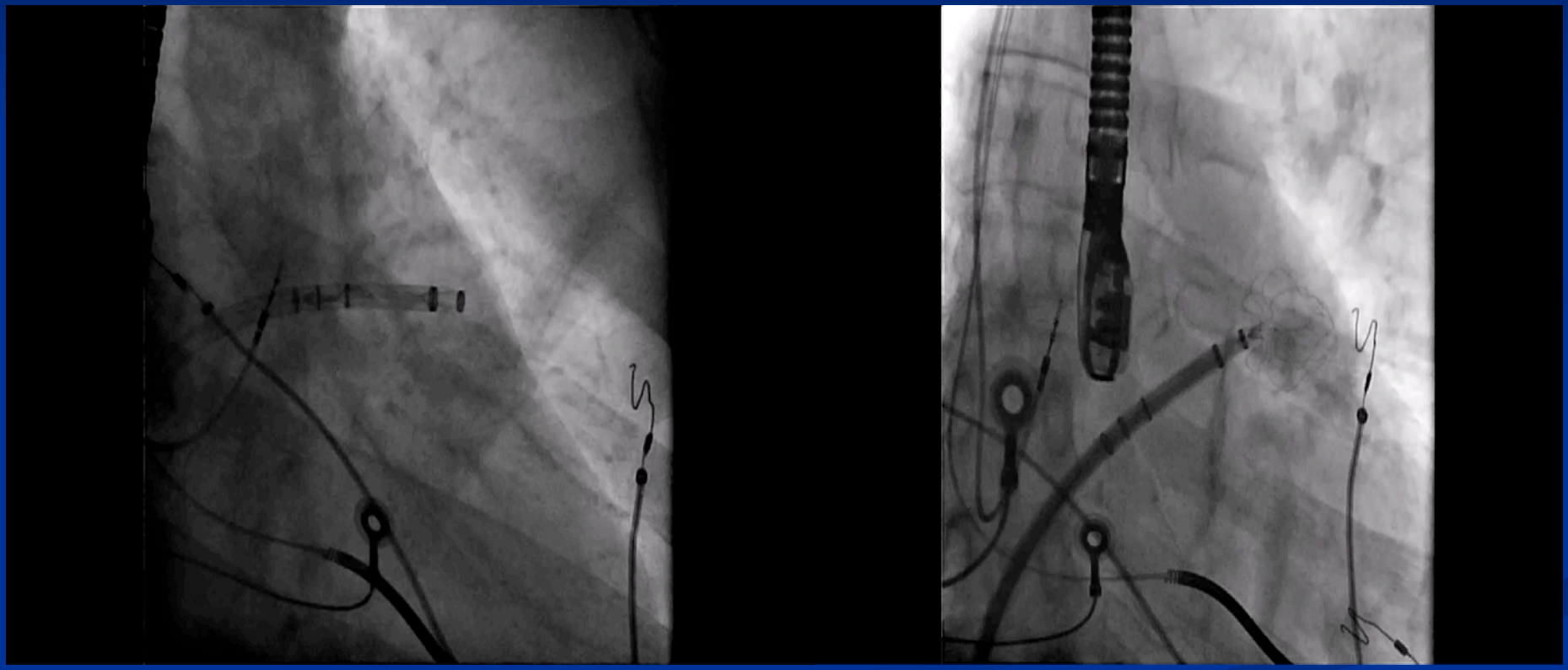
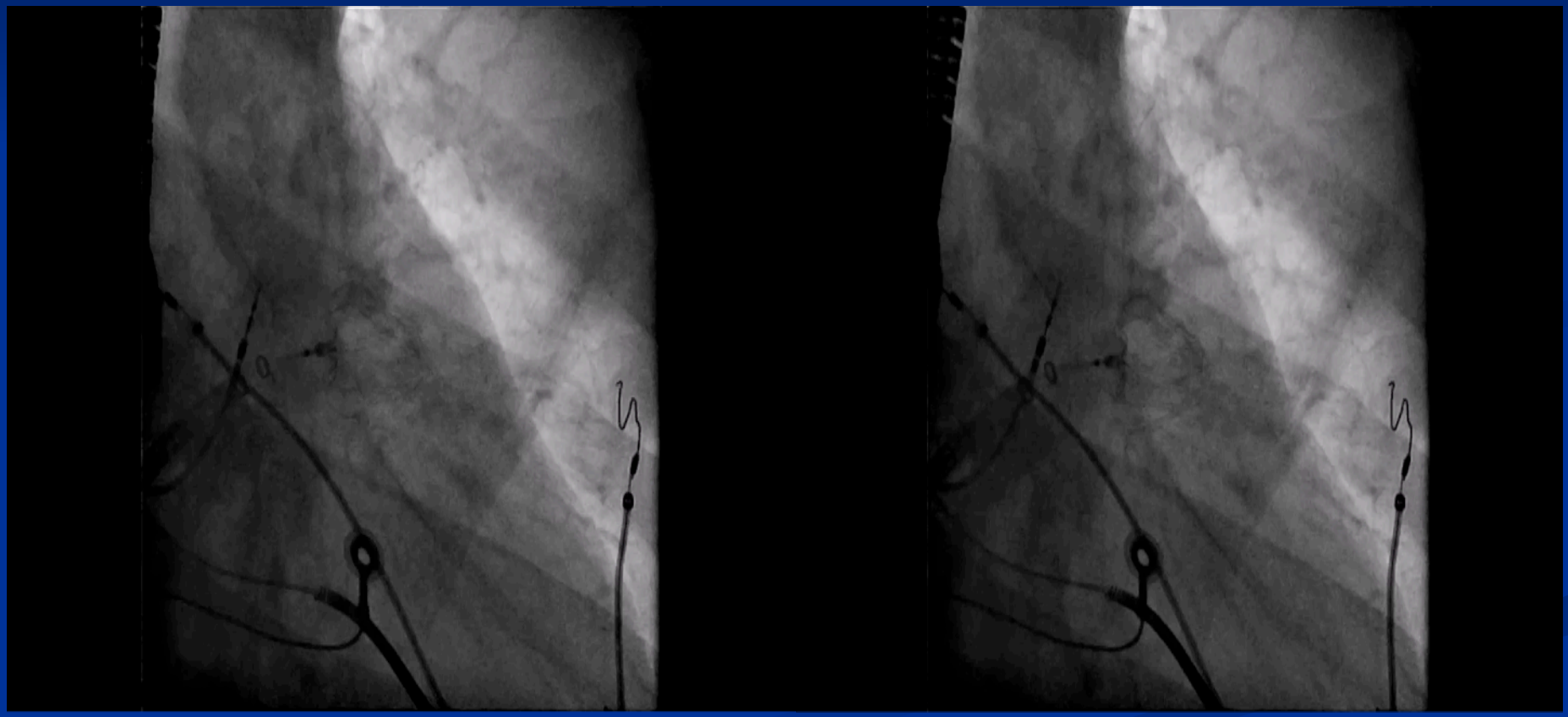


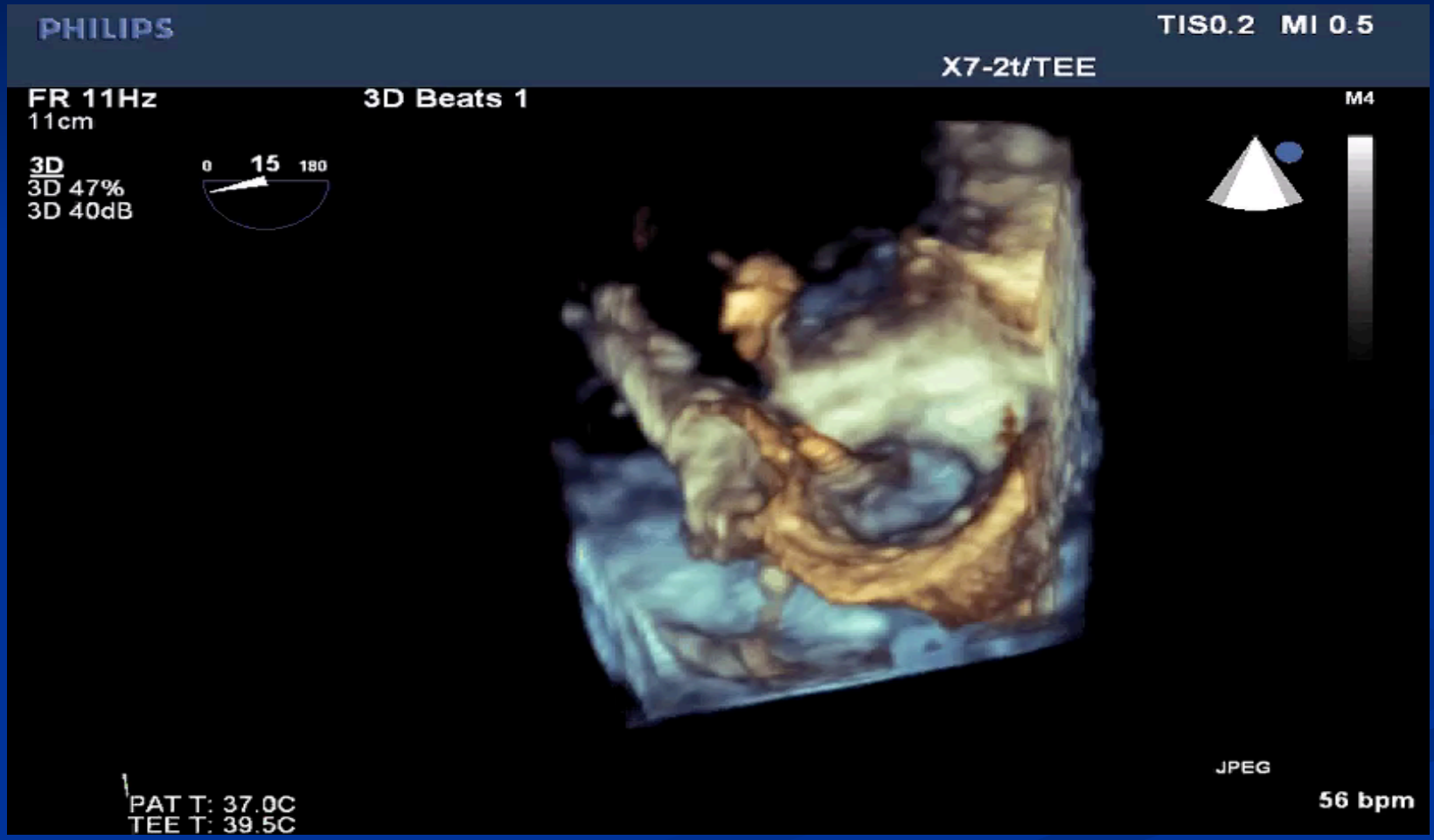
Device Deployment-Another Critical Step



Tug Test and Device Delivery



3 D Tug Test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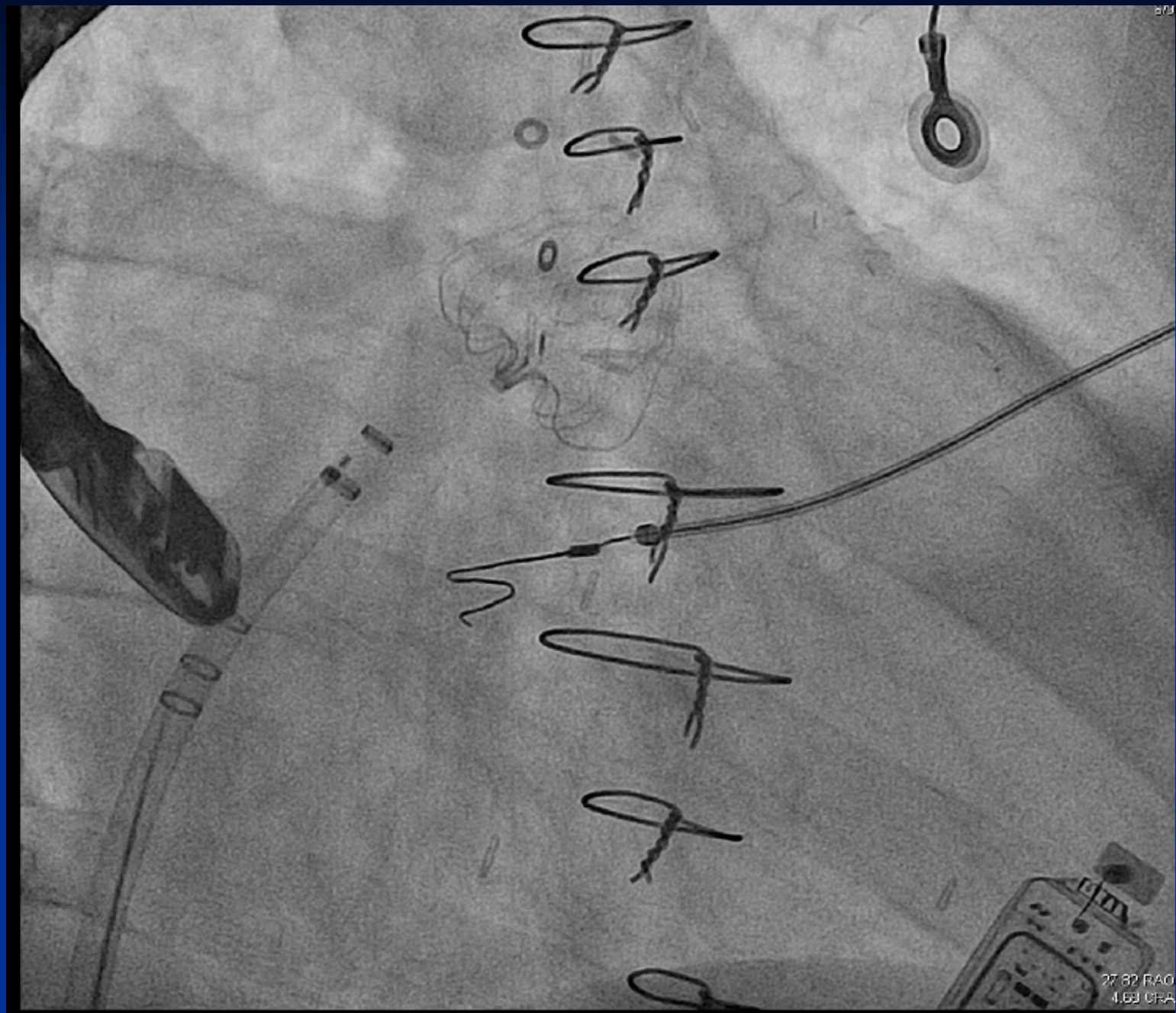
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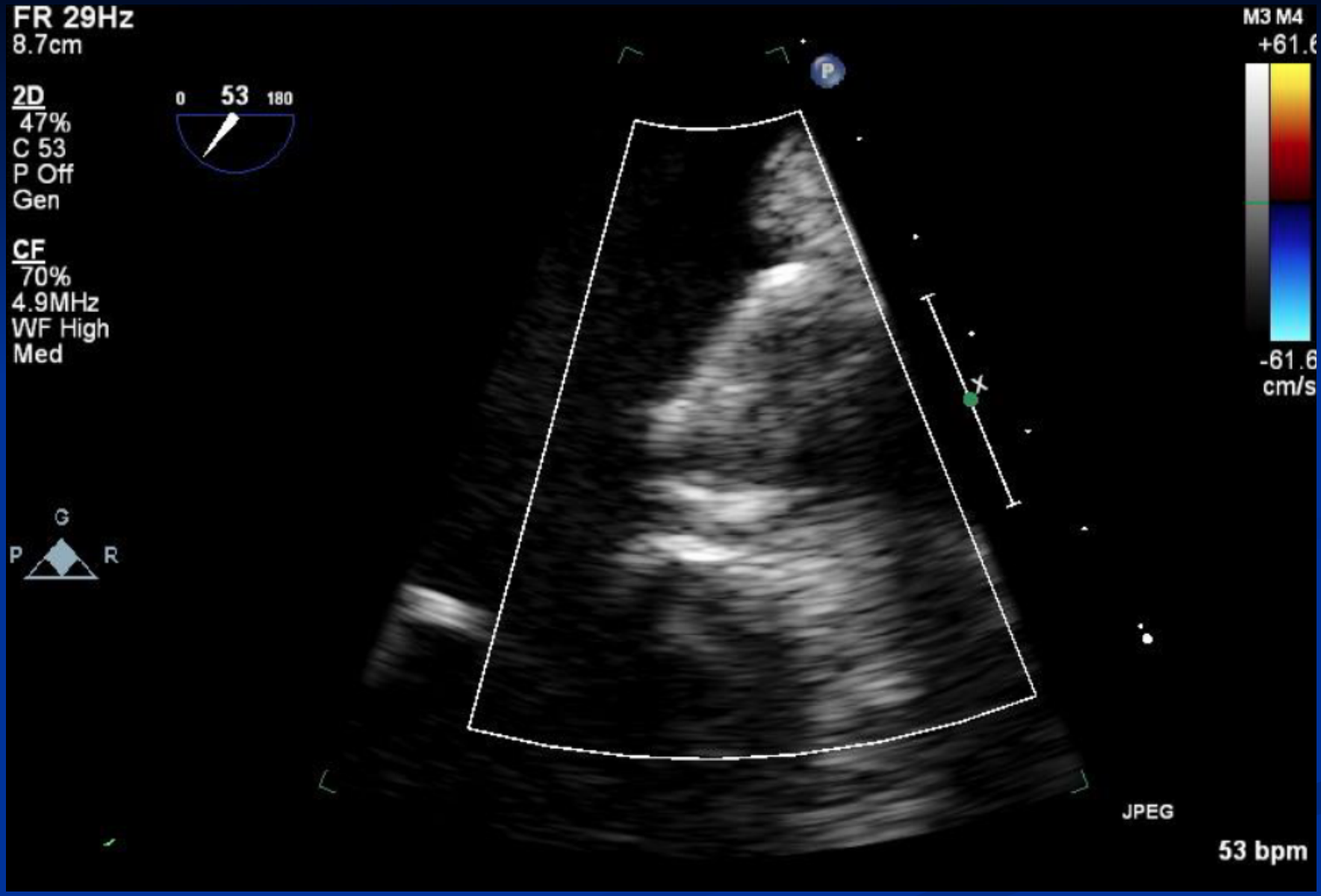
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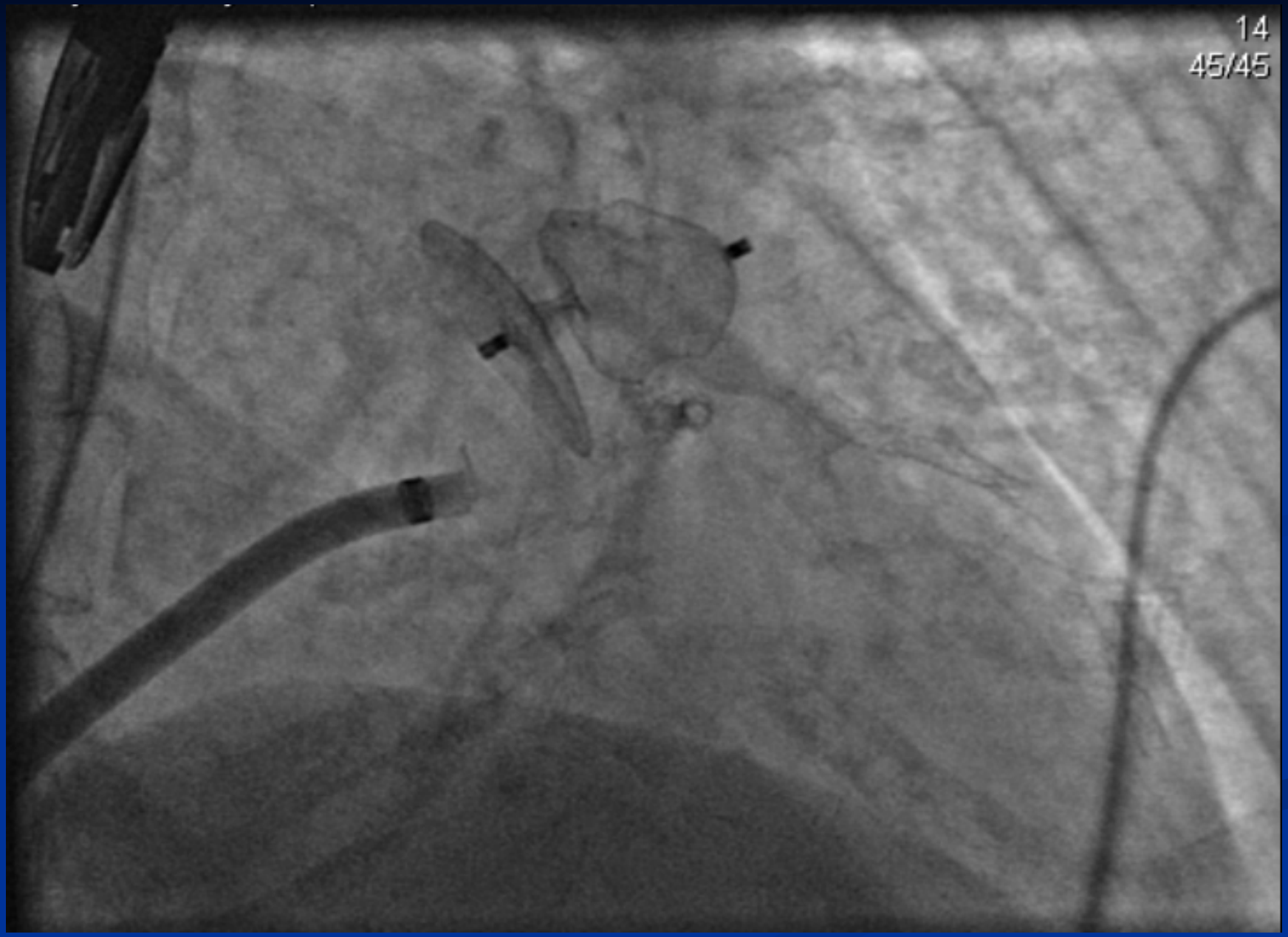
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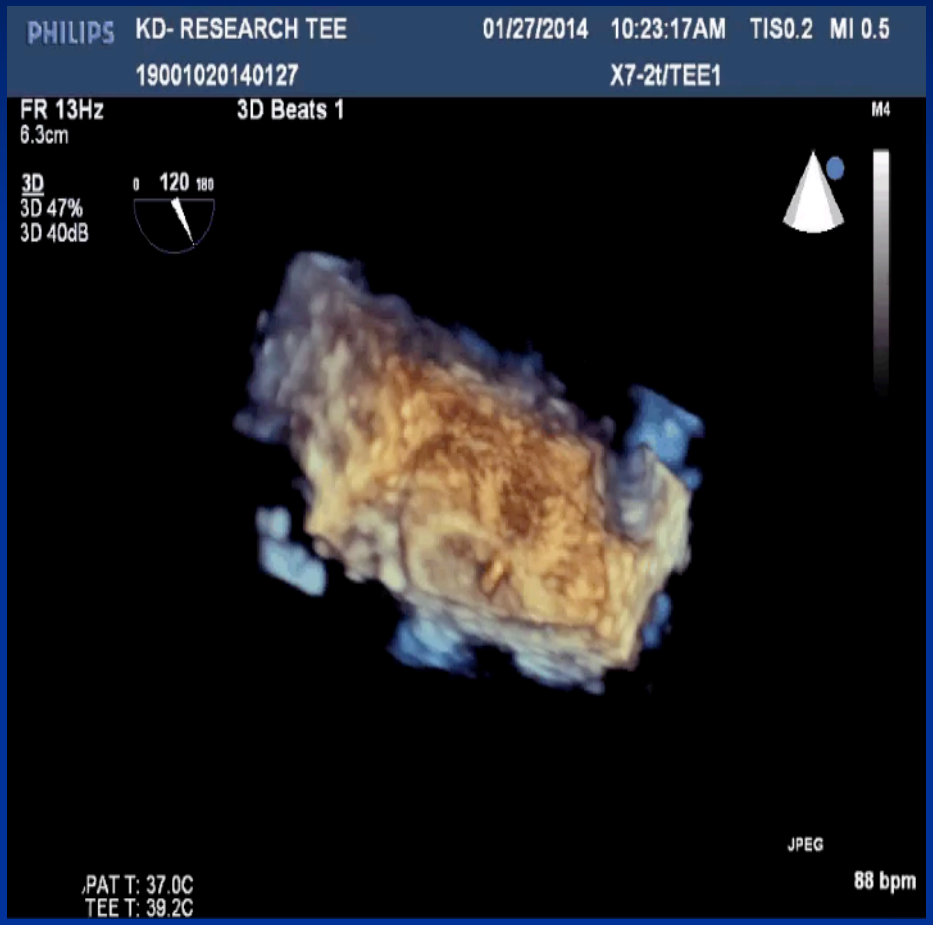
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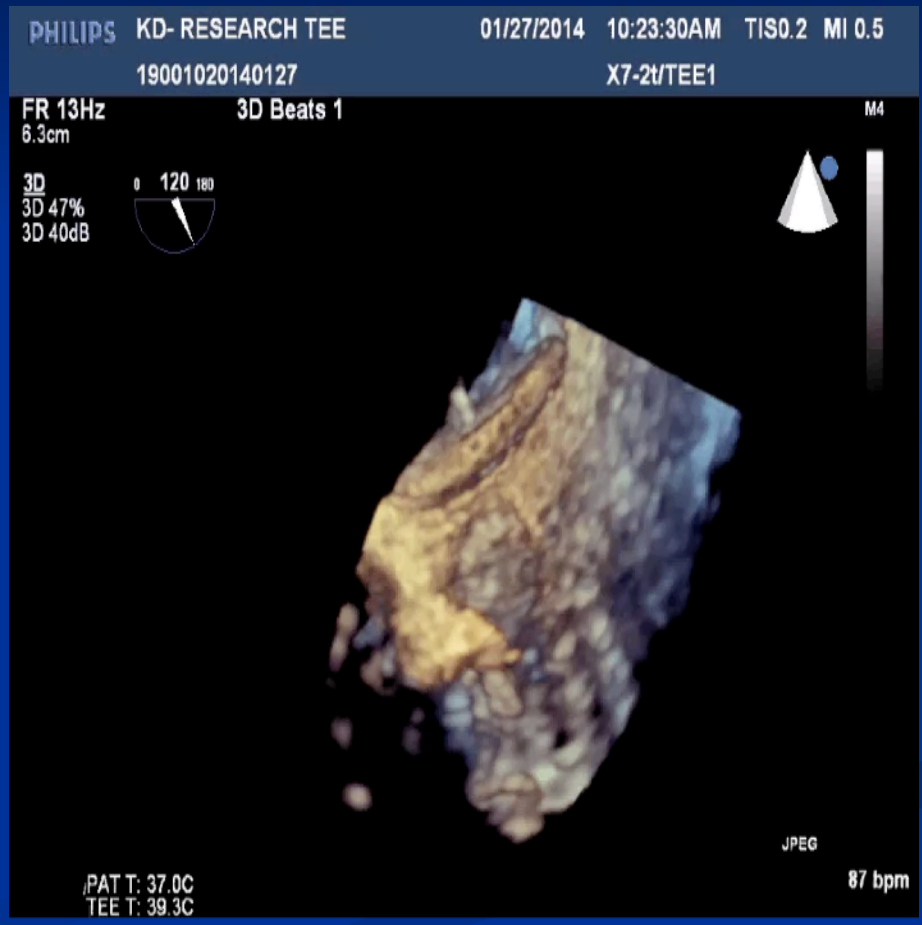
88 bpm


PHILIPS KD- RESEARCH TEE 01/27/2014 10:23:30AM TIS0.2 MI 0.5
19001020140127 X7-2t/TEE1
FR 13Hz 3D Beats 1 M4
6.3cm
3D
3D 47%
3D 40dB
0 120 180
JPEG
PAT T: 37.0C
TEE T: 39.3C
87 bpm

Stroke Prevention in AF-Conclusion

- AF is associated with high stroke rate
- Warfarin IS NOT the only effective anticoagulant anymore
- The new oral AC are at least as effective as Warfarin and might replace it soon
- Familiarity with these newer drugs is important
- LAA occlusion in patients with contraindication for OAC.

Thank You

- Questions?