

Work-up and Treatment of PVCs

Bradley P. Knight, MD
Director of Cardiac Electrophysiology
Northwestern University



Prince Herdle

bknight@nm.org
[@DrBradleyKnight](https://twitter.com/DrBradleyKnight)

Disclosure Information

Bradley P. Knight MD

Consultant, Speaker, Investigator, Fellowship Support

- Abbott
- Biosense Webster
- Biotronik
- Boston Scientific
- Medtronic
- SenteHeart

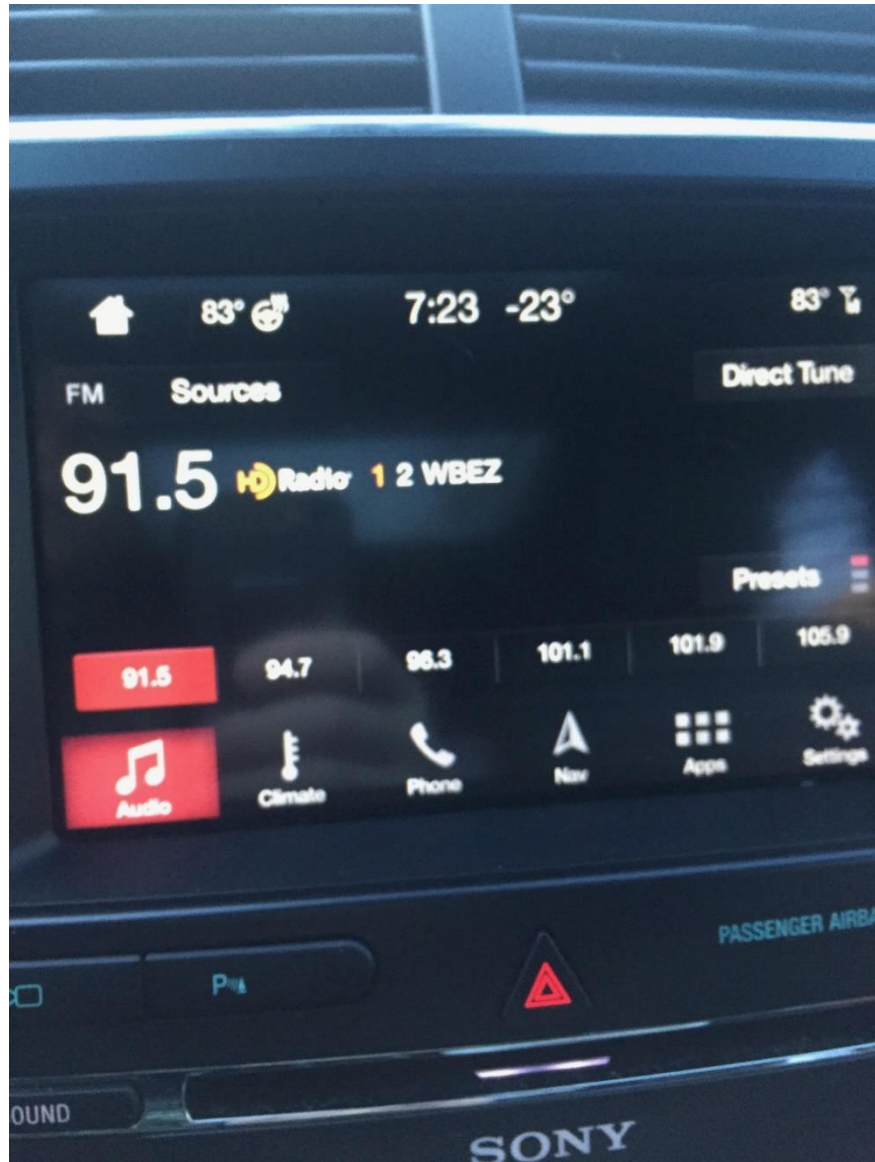
Equity, Ownership, Stock, Employment

- None

Annual Disclosures Available on

CMS Website: <https://openpaymentsdata.cms.gov/physician/>

NU Website: <https://www.feinberg.northwestern.edu/faculty-profiles/>



83° 7:23 -23° 83°

FM Sources Direct Tune

91.5 HD Radio 1 2 WBEZ

Presets

91.5 94.7 96.3 101.1 101.9 105.9
Audio Climate Phone Nav Apps Settings

PASSENGER AIRBA

SONY

Entire OR Team Kneels During Timeout to Protest Administrators

GREEN BAY, WI - In a stunning turn of events, entire OR teams including Anesthesia knelt today during all surgical timeouts today at Bellin Hospital.

The shocking display of unity against the hospital administrators has sharply divided the medical community across the globe.

The impetus of the mass genuflection was a lone General Surgeon, Dr. Bessie Jandle, who refused to comply with the mandate from [Joint Commission](#) that all OR staff wear [bouffant](#) scrub caps. Jandle started kneeling during timeouts in protest over a year ago, but no one paid much attention to it even after his contract with Bellin Health was not renewed.



This summer, several other isolated surgeons started kneeling during their own timeouts which caught the attention of Bellin Health hospital administrator Timofy Weeber MPH, MHA, GED, POS. Weeber demanded that all departments fire any and all surgeons who refused to stand for timeouts. Weeber's demands, which he didn't have the authority, ability or spine to enforce, actually served to galvanize and unite the entirety of the OR staff.

In OR 2, every person in the OR including the patient dropped down to a knee arms interlinked for the [timeout](#). Numerous other OR's had similar happenings with 75% of all OR teams dropping to a knee or sitting down for the timeout. When word started to spread of the protests, several anesthesiologists claimed that they have been sitting down during timeouts and even entire cases for years.

Meanwhile in OR 4, Ortho also took a knee and replaced it with a better one.

PVCs: Type of Presentation

- Palpitations
- Incidentally noted

PVCs: Goals at Initial Encounter

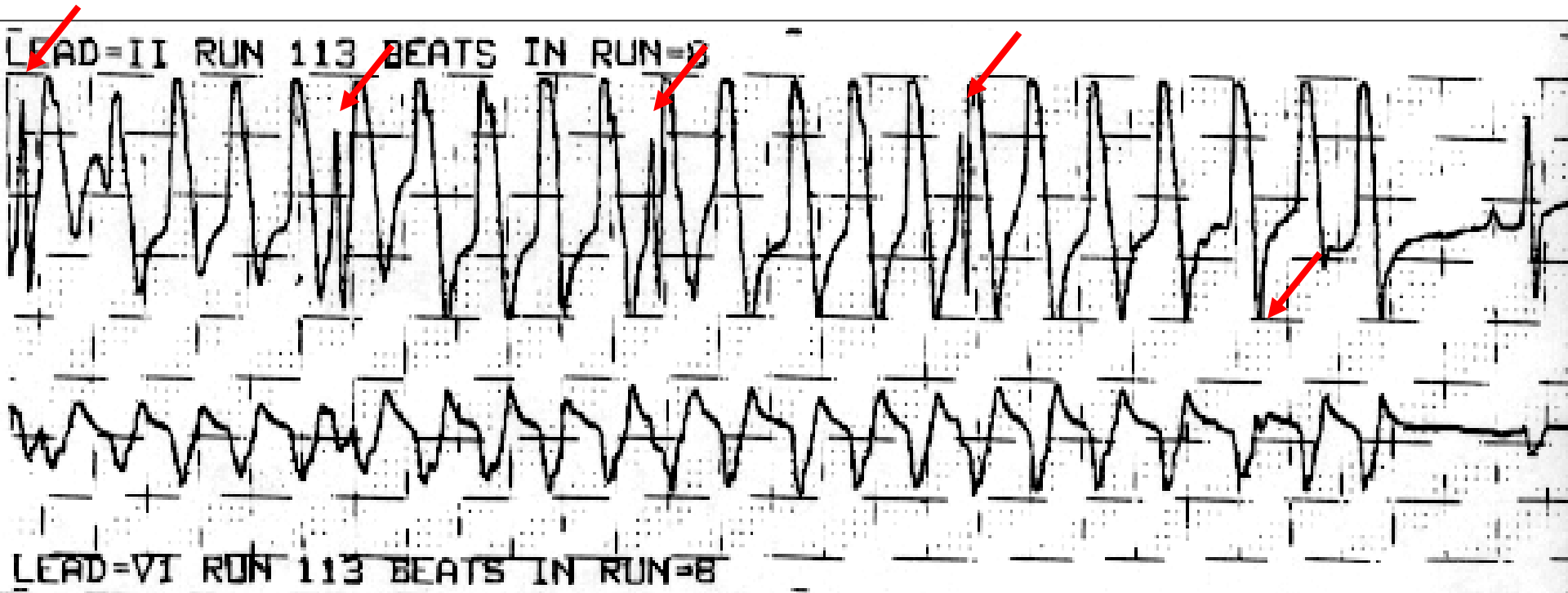
- Prevent sudden death
- Avoid PVC-induced cardiomyopathy
- Minimize symptoms

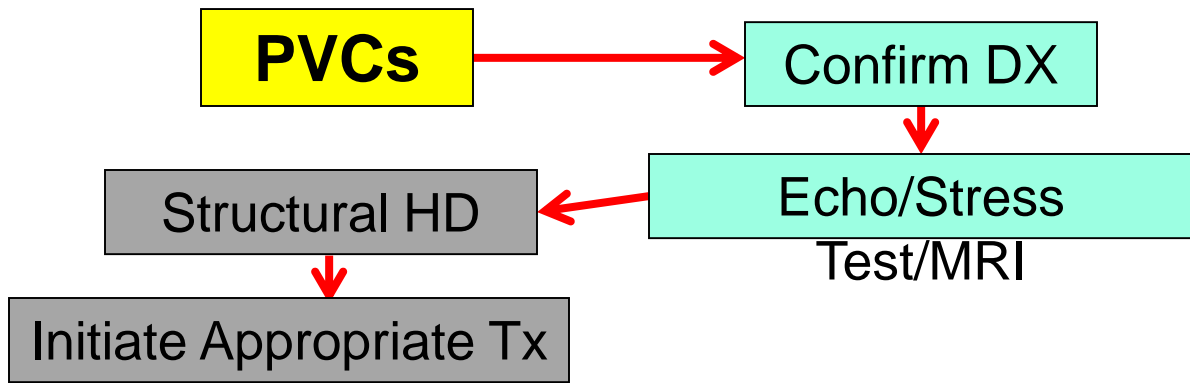
PVCs



Confirm DX

Case: What is the Diagnosis?

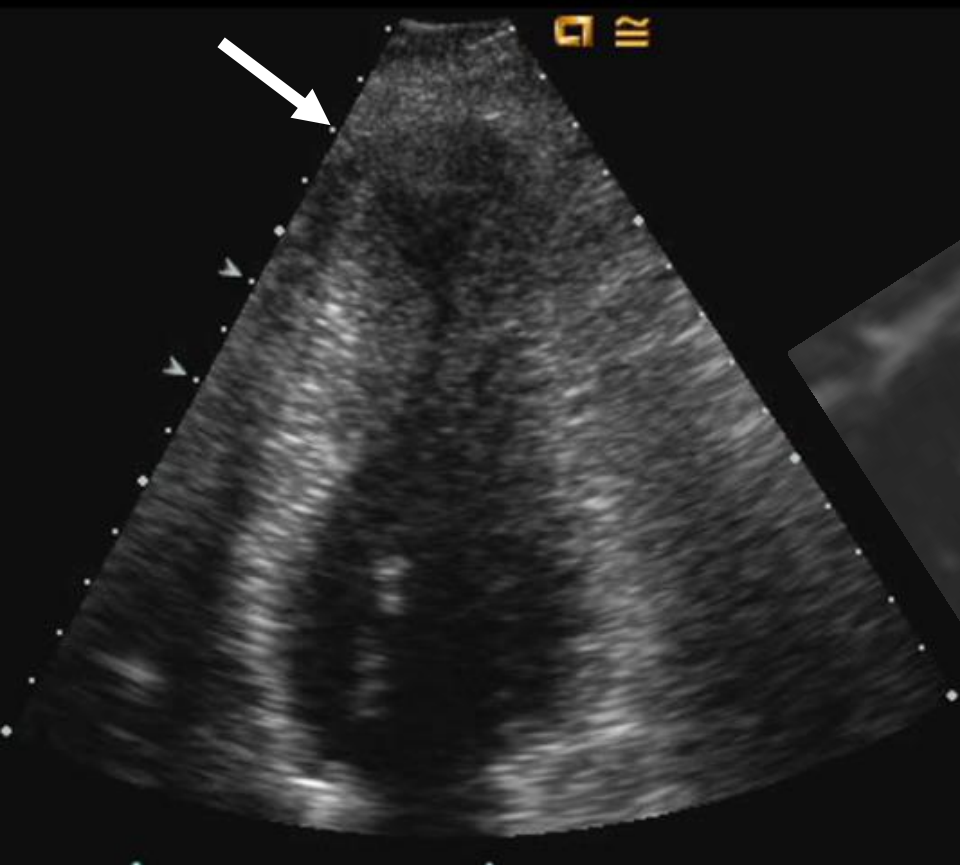




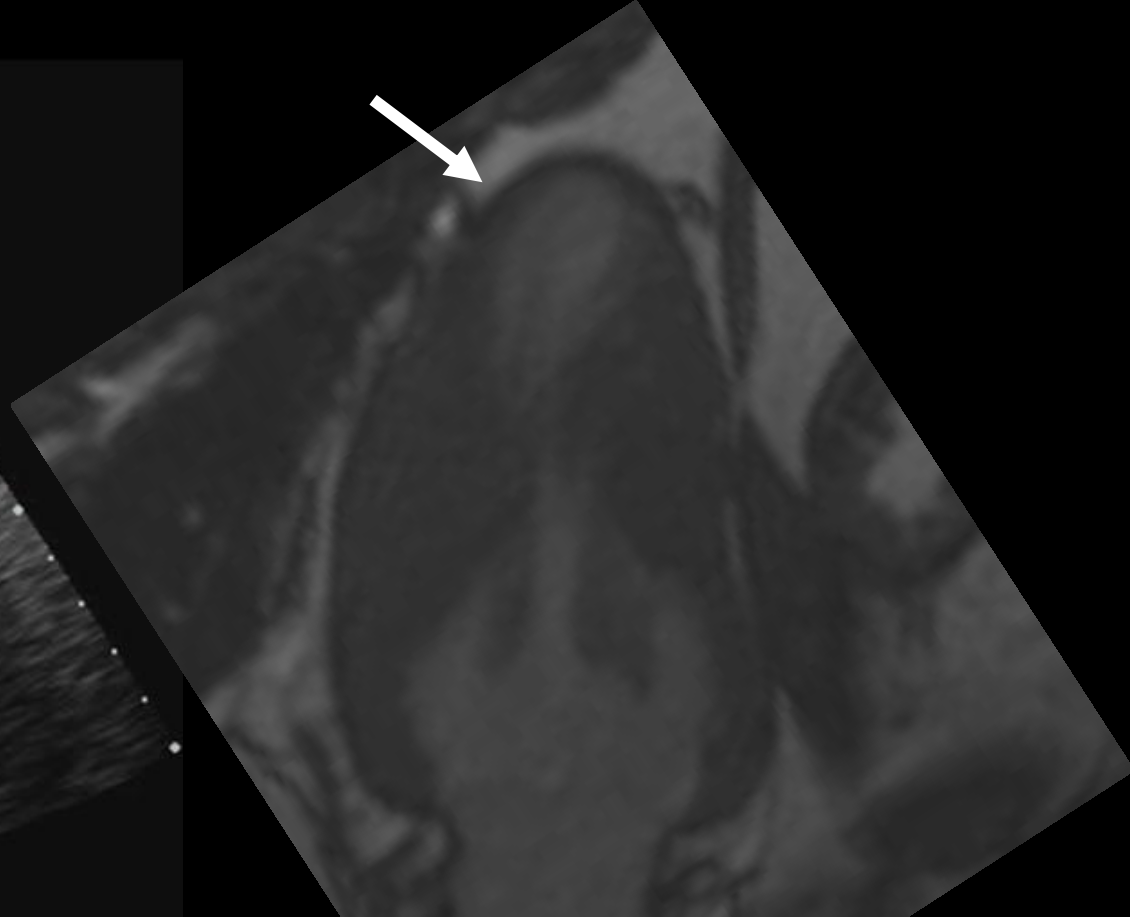
HCM with LV Apical Aneurysm

28/1299 (2%) of pts with HCM had LVAA
MR useful for identification. Clot common.
Maron et al, *Circulation* 2008

Echo



MR

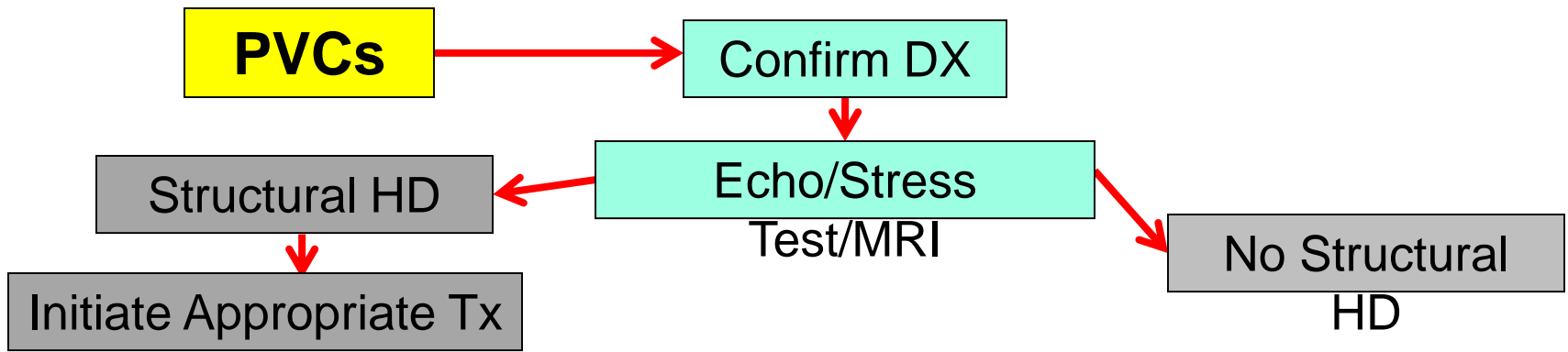


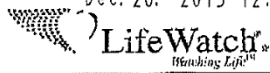
Case

- 35 y/o man crashes car and is found to have frequent PVCs.
- EKG below.
- What is your diagnosis?

Lead V1







ACT* Episode Report

<p>Doctor Information</p> <p>ALEXIAN BROTHERS HOSPITAL 800 BIESTERFIELD ELKGROVE VILLAGE, IL 60007</p>	<p>Patient Information</p> <p>Name: ID #: G000554359 DOB: , 67 years old Sex: Female Phone: Monitor Type: LifeStar ACT3 Diag: Enrollment Period: 12/23/2013 - 01/21/2014</p>
---	---

67 y/o woman
No structural
heart disease
Frequent PVCs

Past 3 Episodes:	Date	Time	Symptoms	Findings	Auto or Manual Trigger
ACT EPISODE 12/23/2013 10:29 am (CST)					

SYMPTOMS: ACT BASELINE TRANSMISSION

ACTIVITY:

PRELIMINARY FINDINGS: SINUS TACHYCARDIA, PVCs

COMMENTS: TRANSMISSION CONTAINS 1 RECORDED EVENT

EVENT RECORDER DATA: Pre-Event Length: 0 sec. Post-Event Length: 60 sec.

MD/DO Signature: _____

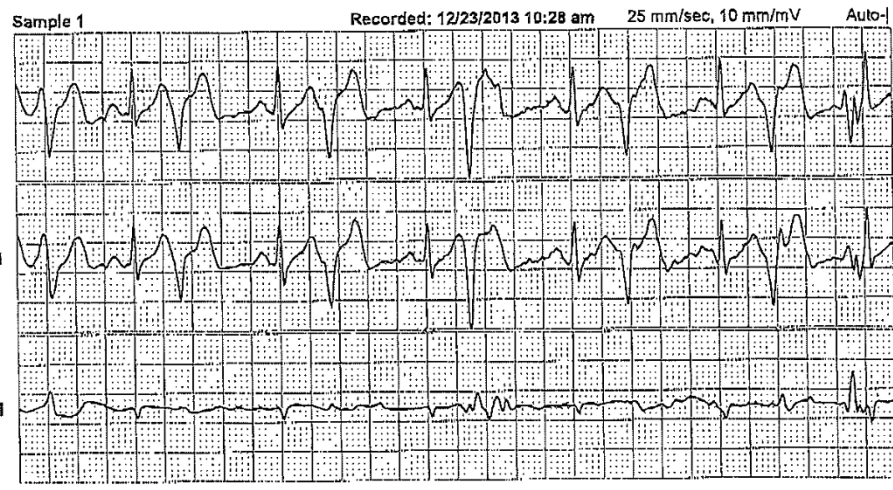
MEASUREMENTS:

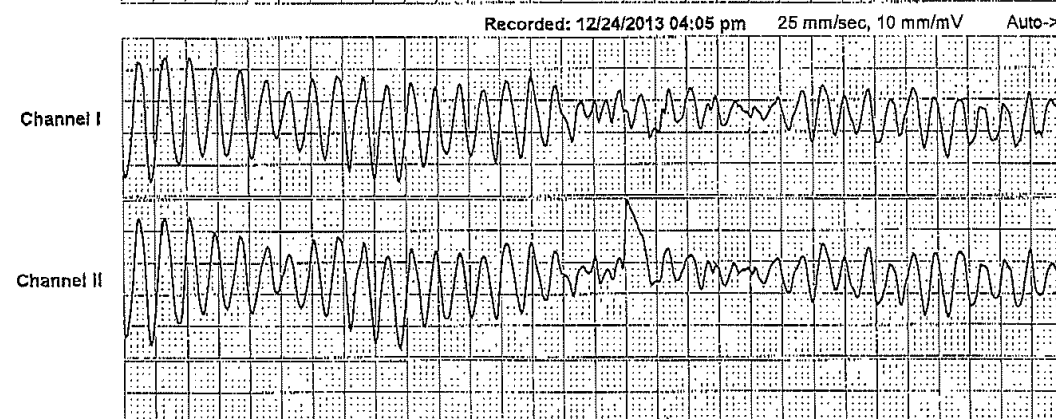
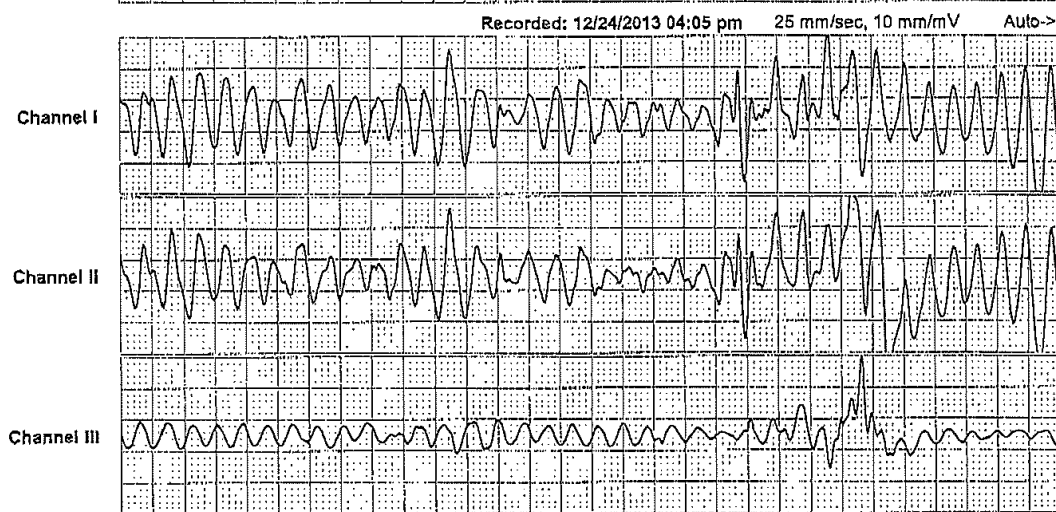
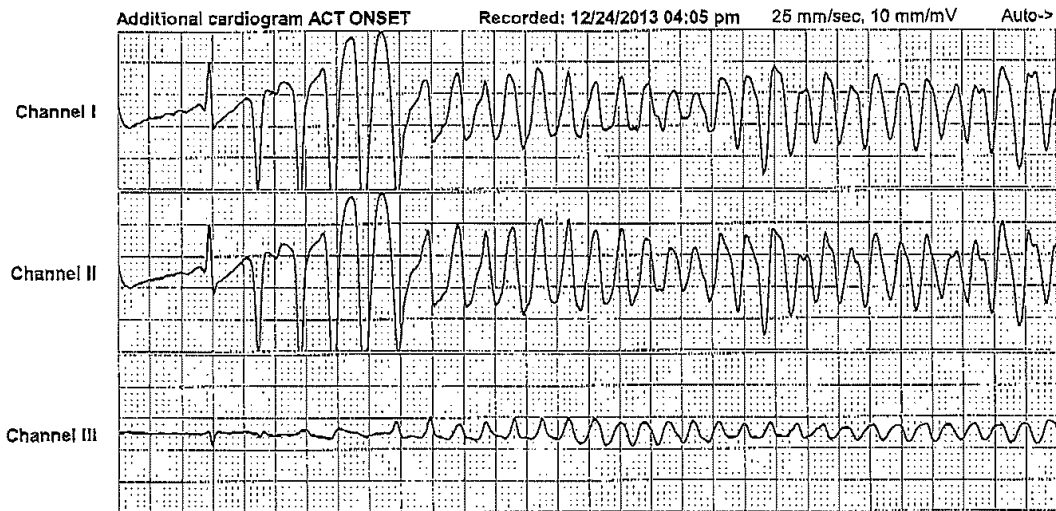
HEART RATE RANGE
> 40 bpm, < 150 bpm

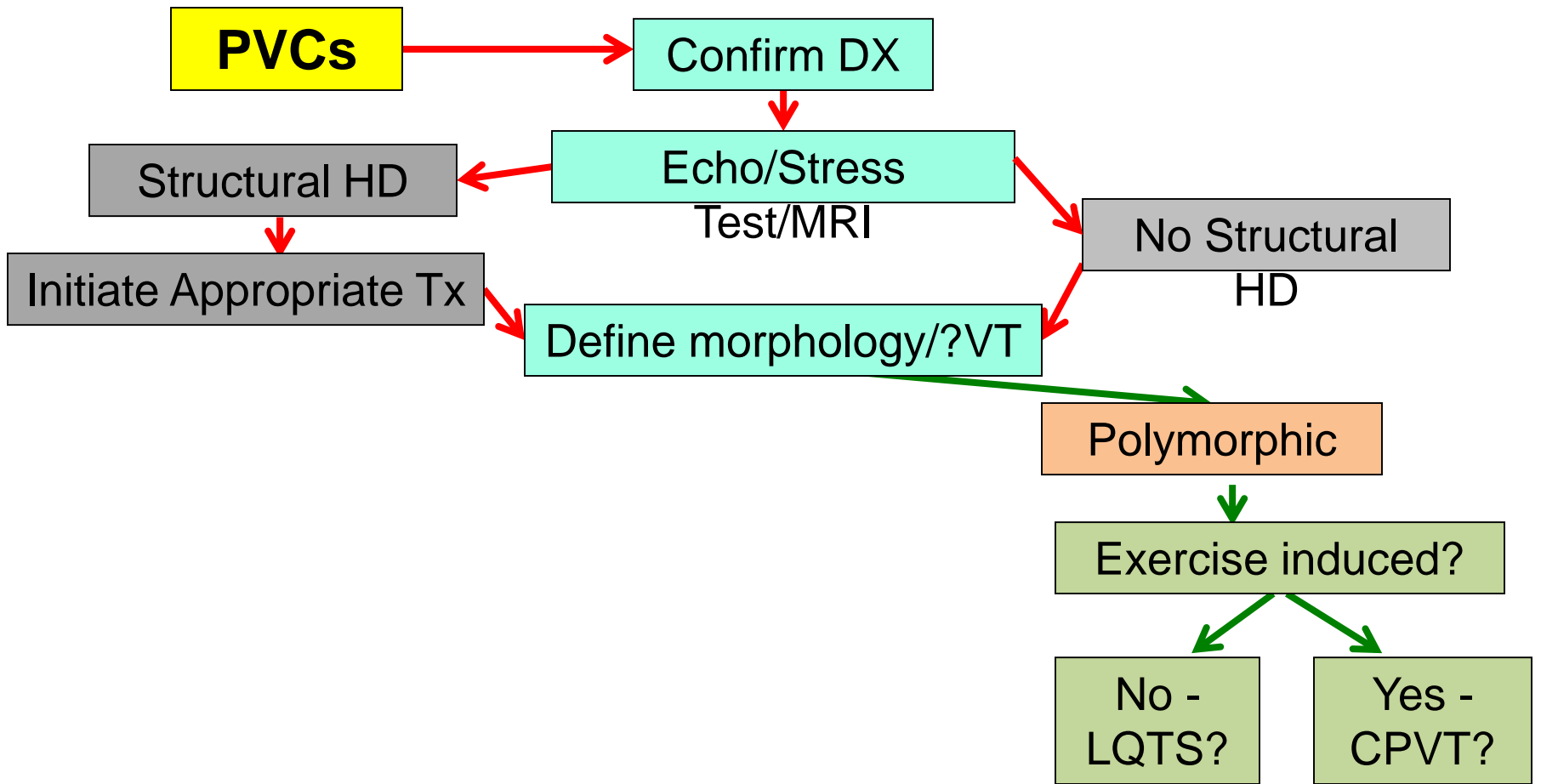
PR INTERVAL
< 0.24 sec interval

QRS
< 0.12 sec interval

QT
< 0.44 sec interval



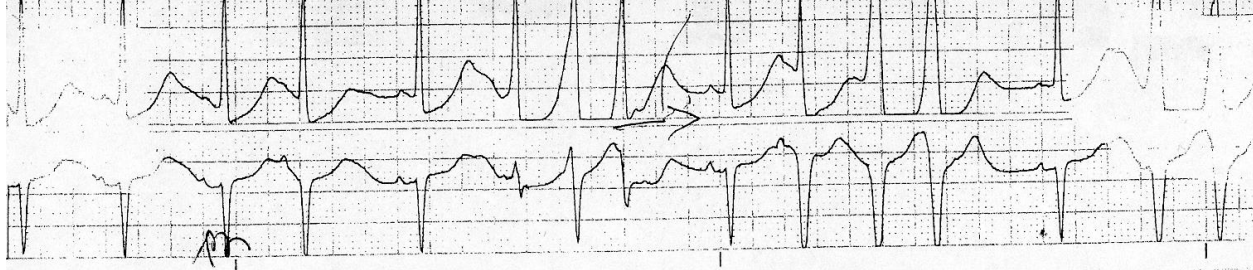




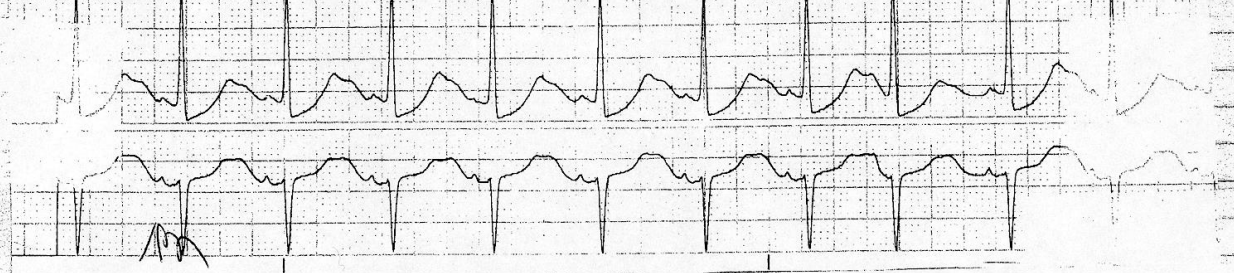
DATE
TIME

Torsades de Pointe caused by methadone

Jordan, Sandra CCU7 3/12/2009 15:06:22 HR 131 SV TACHY RHYTHM RUN PVCs PULSE 89 PVC 27 NBP 158/83 (99) RESP 19 %SpO2 10



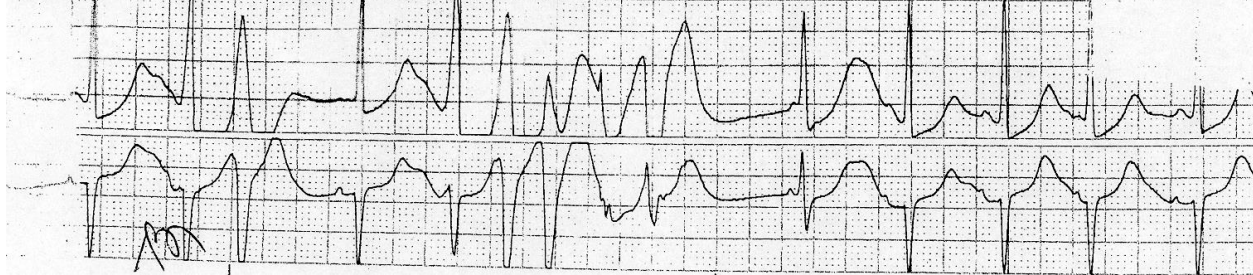
Jordan, Sandra CCU7 3/12/2009 15:31:24 HR 93 SINUS RHYTHM PULSE 94 PVC 0 NBP 157/85 (101) RESP 18 %SpO2 100

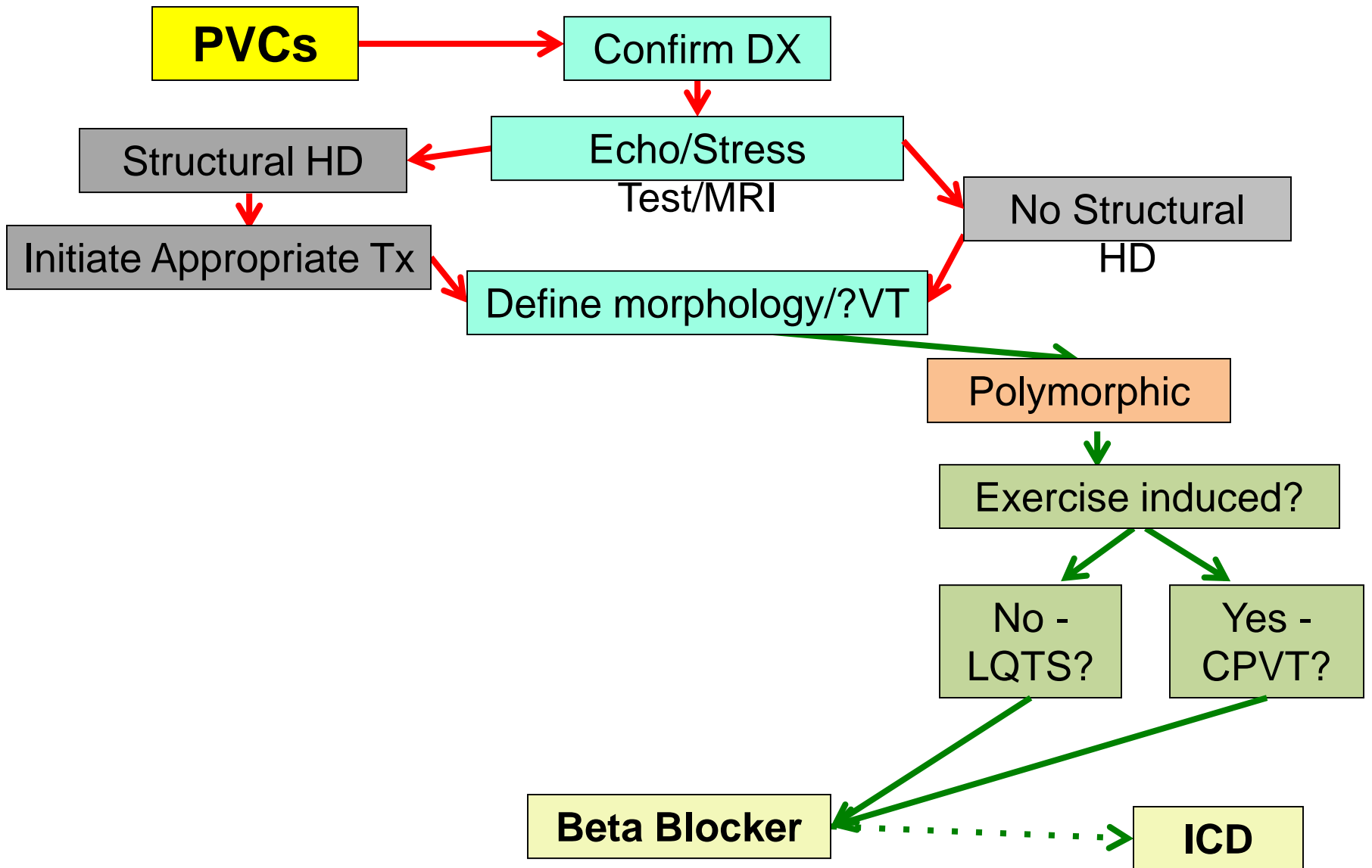


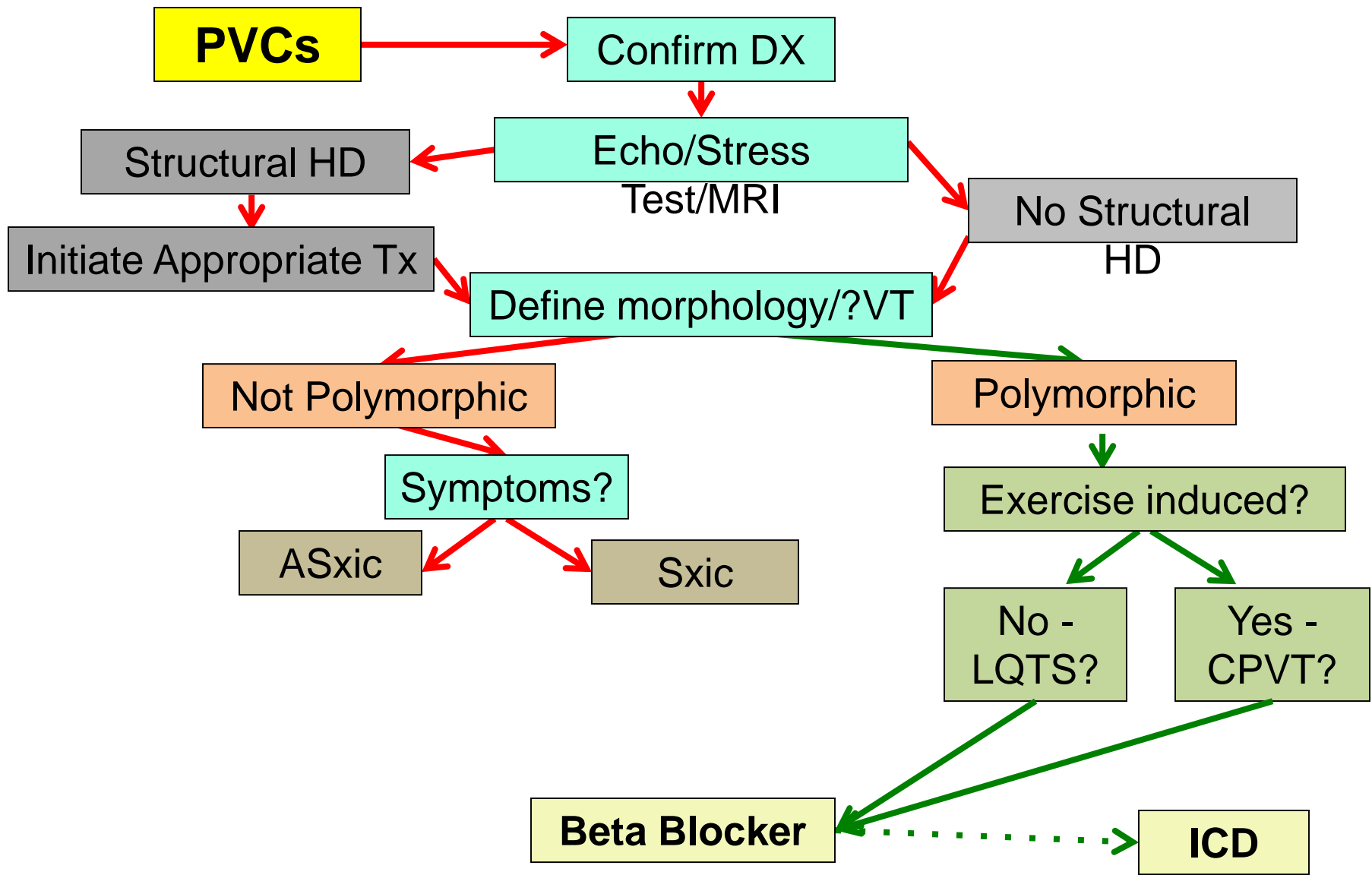
Jordan, Sandra CCU7 3/12/2009 15:43:48 HR 134 UNKNOWN ECG RHYTHM RUN PVCs PULSE 85 PVC 43 NBP 177/85 (100) RESP 19 %SpO2 100



Jordan, Sandra CCU7 3/12/2009 15:44:05 HR 111 UNKNOWN ECG RHYTHM RUN PVCs PULSE 73 PVC 41 NBP 177/85 (100) RESP 19 %SpO2 100





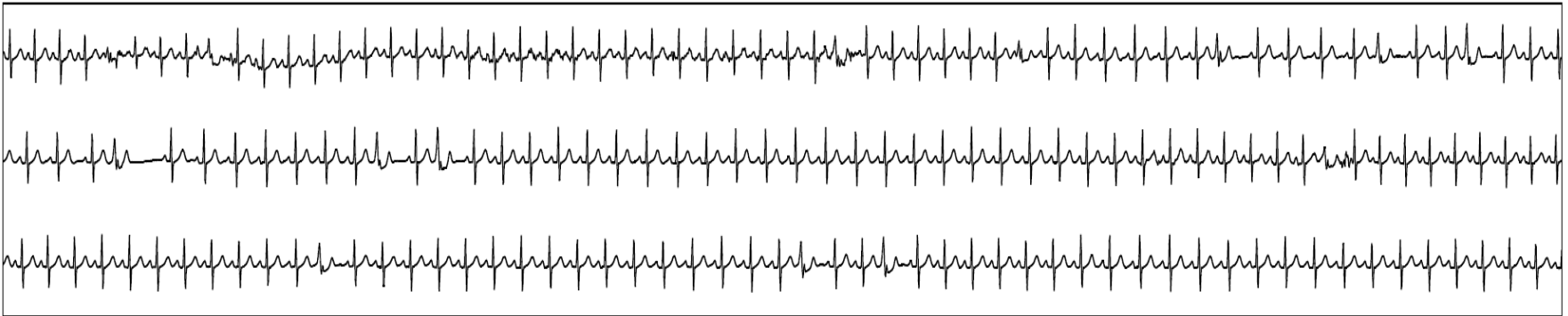


Correlation of Symptoms with PCVs

Date	Time	Symptoms	Duration	Activity
01/11/19	10:45am	fluttering/racing, pounding	less than 1 min	sitting

Findings: Sinus (112 bpm), VE(s)

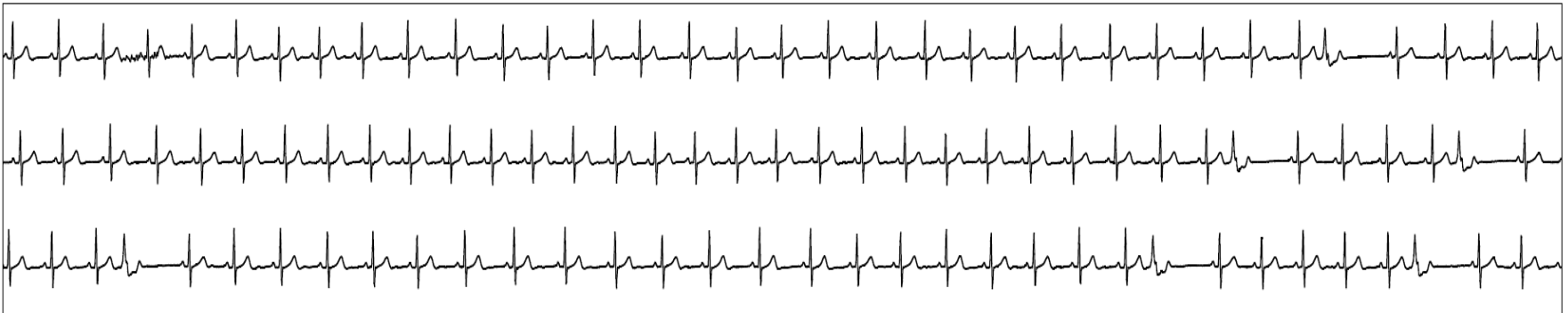
Q 1.8x, 90 s

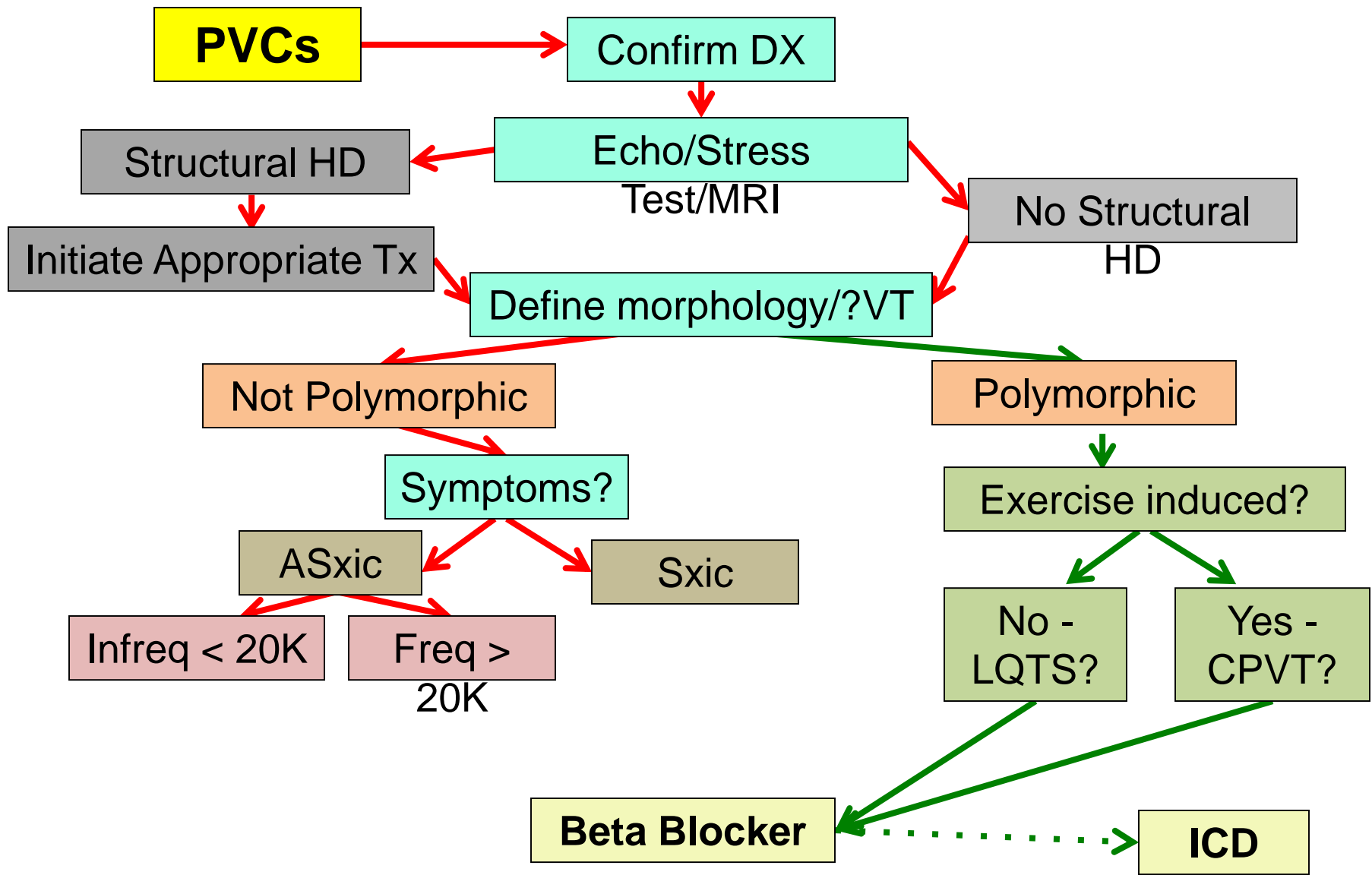


Date	Time	Symptoms	Duration	Activity
01/12/19	05:35pm	fluttering/racing, pounding	less than 1 min	sitting

Findings: Sinus (70 bpm), VE(s)

Q 1.8x, 90 s

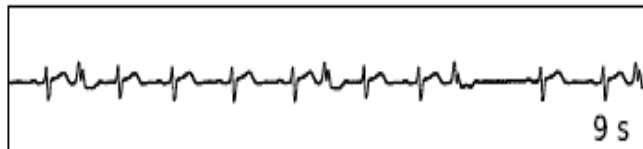
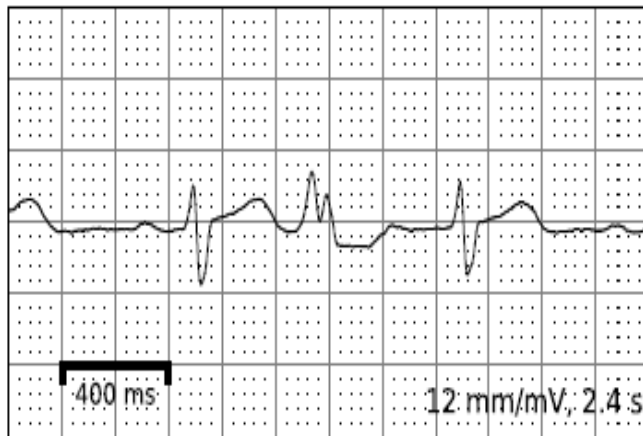




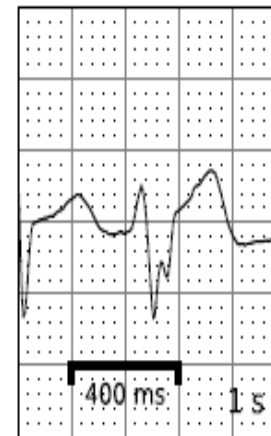
Quantification and Characterization of PVCs

1

Isolated VE Beats by Unique Morphology



21.4% burden



7.5% burden

PVCs

Confirm DX

Structural HD

Echo/Stress
Test/MRI

No Structural
HD

Initiate Appropriate Tx

Define morphology/?VT

Not Polymorphic

Polymorphic

Symptoms?

Exercise induced?

ASxic

Sxic

No -
LQTS?

Yes -
CPVT?

Infreq < 20K

Freq >
20K

Beta Blocker

ICD

Reassur

Periodic Reevaluation

PVCs

Confirm DX

Structural HD

Echo/Stress Test/MRI

No Structural HD

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No - LQTS?

Yes - CPVT?

Infreq < 20K

Freq > 20K

EF NI

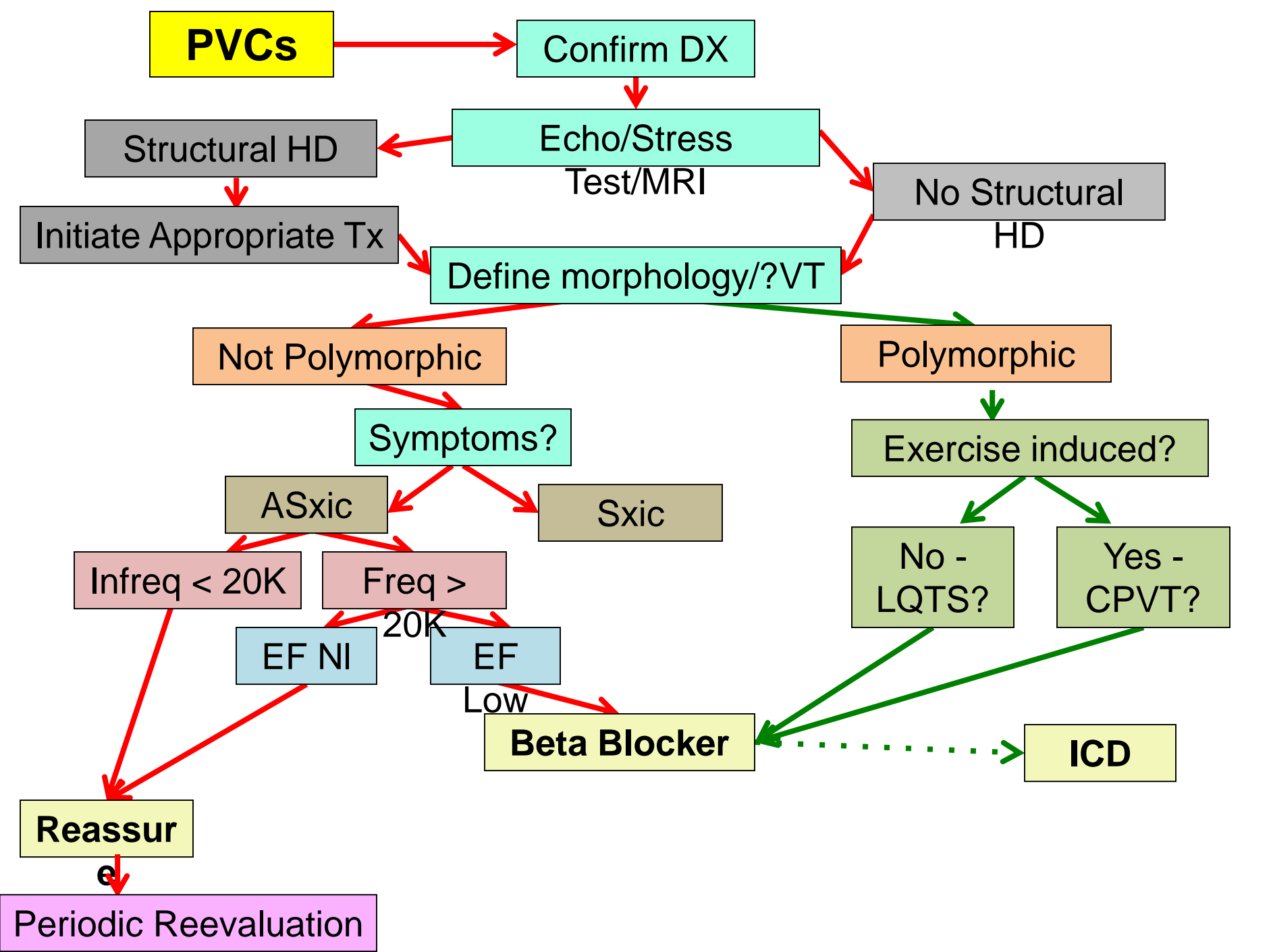
EF Low

Beta Blocker

ICD

Reassur

Periodic Reevaluation



PVCs

Confirm DX

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Echo/Stress
Test/MRI

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HD

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Yes -
CPVT?

Infreq < 20K

Freq >
20K

EF NI

EF
Low

Beta Blocker

ICD

Reassur

e

Periodic Reevaluation

Case

- 50 y/o man with 29% PVC burden, mild LV

Baseline

Post Metoprolol

Date of Birth	Patient ID	Gender	Primary Indication (I49.3)	Enrollment Period	Analysis Time
09/28/68 (50 yrs)		Male	Ventricular premature	12 days 4 hours	9 days 1 hour
Prescribing Clinician Dr. R. Mutharasan		Managing Location Chicago		10/01/18, 09:24am to 10/13/18, 01:04pm (after artifact removed)	

Ventricular Tachycardia (4 beats or more)	
None found	

Pauses (3 secs or longer)	
None found	

AV Block (2nd° Mobitz II, 3rd°)	
None found	

Atrial Fibrillation	
None found	

Supraventricular Tachycardia (4 beats or more)	
None found	None found

Preliminary Findings	
Patient had a min HR of 52 bpm, max HR of 153 bpm, and avg HR of 81 bpm. Predominant underlying rhythm was Sinus Rhythm. No isolated SVEs, SVE Couplets, or SVE Triplets were present. Isolated VEs were frequent (28.9%, 299211), VE Couplets were rare (<1.0%, 3416), and VE Triplets were rare (<1.0%, 5). Ventricular Bigeminy and Trigeminy were present.	

Heart Rate	
Overall	Max 153 bpm 10:52am, 10/12 Min 52 bpm 04:24am, 10/02 Avg 81 bpm
Sinus	Max 153 bpm 10:52am, 10/12 Min 67 bpm 10:55pm, 10/08 Avg 85 bpm

Patient Events	
Triggered Events: 7	Findings within ± 45 sec of Triggers: Sinus Rhythm, Ventricular Bigeminy, Ventricular Trigeminy, Ventricular Ectopic beat(s)

Diary Entries: 0	
Findings within ± 45 sec of Entries:	

Ectopics		
Rare <1%	Occasional 1% to <5%	Frequent 5%+
Supraventricular Ectopy (SVE/PACs)		
Isolated	0	
Couplet	0	
Triplet	0	
Ventricular Ectopy (VE/PVCs)		
Isolated	Frequent 28.9%	299211
Couplet	Rare <1.0%	3416
Triplet	Rare <1.0%	5

Final Interpretation	
SIGNATURE	

Date of Birth	Patient ID	Gender	Primary Indication (I49.3)	Enrollment Period	Analysis Time
09/28/68 (50 yrs)		Male	Ventricular premature	3 days 0 hours	3 days 0 hours
Prescribing Clinician Dr. B. Knight		Managing Location Chicago		01/22/19, 09:46am to 01/25/19, 09:52am (after artifact removed)	

Supraventricular Tachycardia (4 beats or more)	
Episodes: 1	HR Range: 88-106 bpm Avg: 95 bpm

Ventricular Tachycardia (4 beats or more)	
None found	

Pauses (3 secs or longer)	
None found	

AV Block (2nd° Mobitz II, 3rd°)	
None found	

Atrial Fibrillation	
None found	

Heart Rate	
Overall	Max 141 bpm 10:54am, 01/23 Min 41 bpm 05:21am, 01/25 Avg 61 bpm
Sinus	Same HR as Overall

Patient Events	
Triggered Events: 0	Findings within ± 45 sec of Triggers:

Diary Entries: 0	
Findings within ± 45 sec of Entries:	

Ectopics		
Rare <1%	Occasional 1% to <5%	Frequent 5%+
Supraventricular Ectopy (SVE/PACs)		
Isolated	Rare <1.0%	
Couplet	Rare <1.0%	
Triplet	0	
Ventricular Ectopy (VE/PVCs)		
Isolated	Rare <1.0%	
Couplet	0	
Triplet	0	

Preliminary Findings	
Patient had a min HR of 41 bpm, max HR of 141 bpm, and avg HR of 61 bpm. Predominant underlying rhythm was Sinus Rhythm. 1 run of Supraventricular Tachycardia occurred lasting 6 beats with a max rate of 106 bpm (avg 95 bpm). Isolated SVEs were rare (<1.0%), SVE Couplets were rare (<1.0%), and no SVE Triplets were present. Isolated VEs were rare (<1.0%), and no VE Couplets or VE Triplets were present. Ventricular Trigeminy was present.	

Final Interpretation	
SIGNATURE	

PVCs

Confirm DX

Structural HD

Echo/Stress Test/MRI

No Structural HD

Initiate Appropriate Tx

Define morphology/?VT

Not Polymorphic

Polymorphic

Symptoms?

Exercise induced?

ASxic

Sxic

No - LQTS?

Yes - CPVT?

Infreq < 20K

Freq > 20K

EF NI

EF Low

Beta Blocker

No - LQTS?

Yes - CPVT?

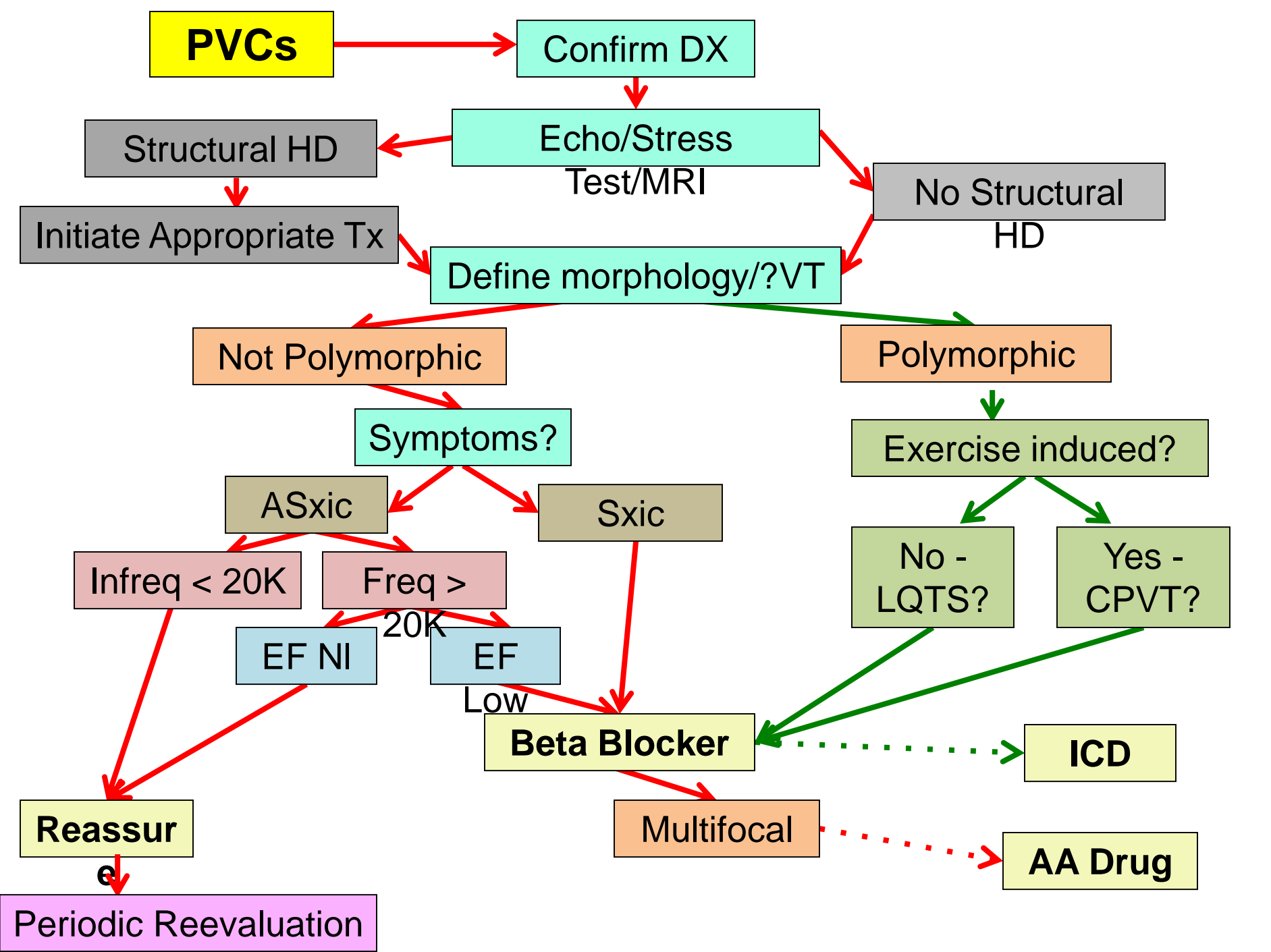
ICD

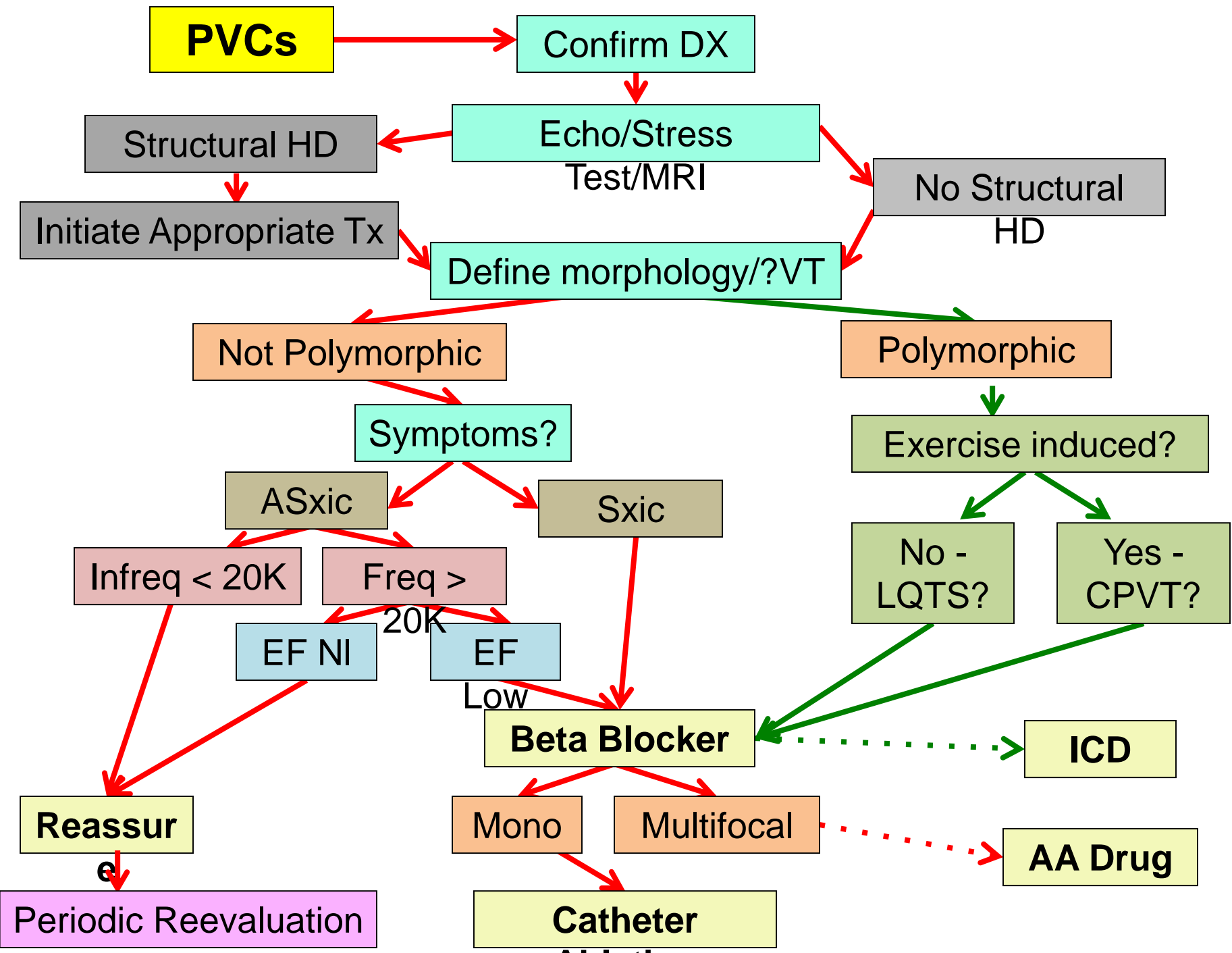
Reassur

Multifocal

AA Drug

Periodic Reevaluation

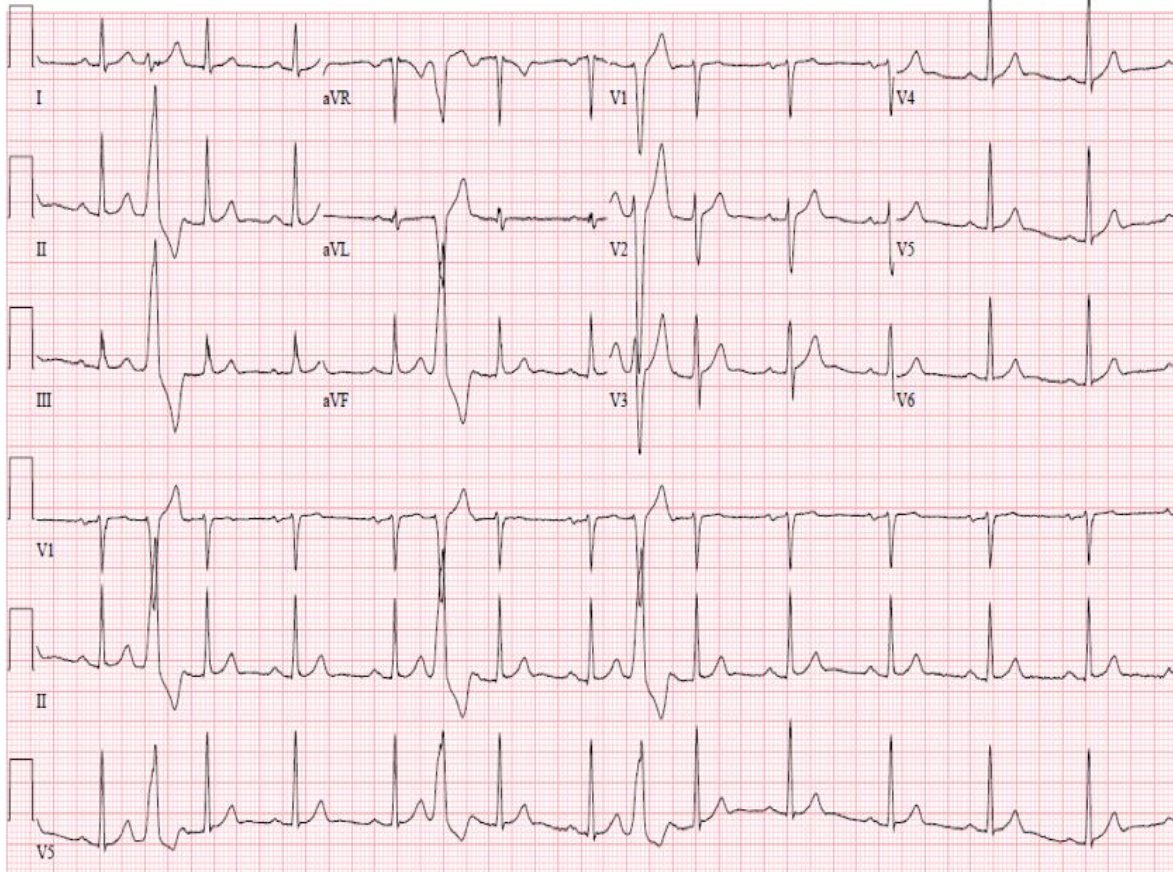




Case

- 45 y/o man with HTN, and frequent moderately symptomatic PVCs, despite beta-blockers.

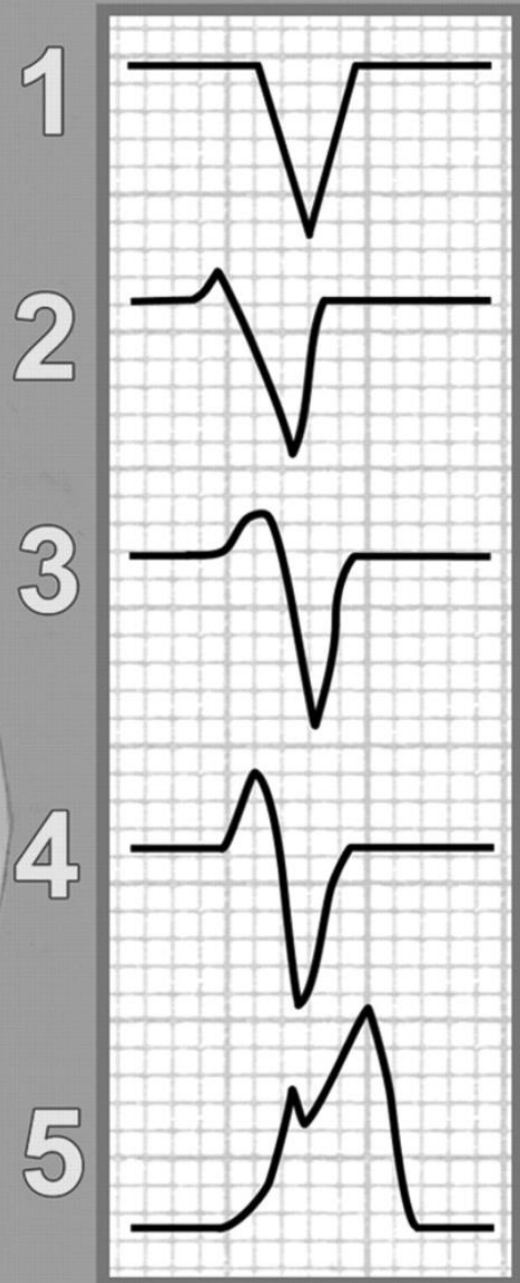
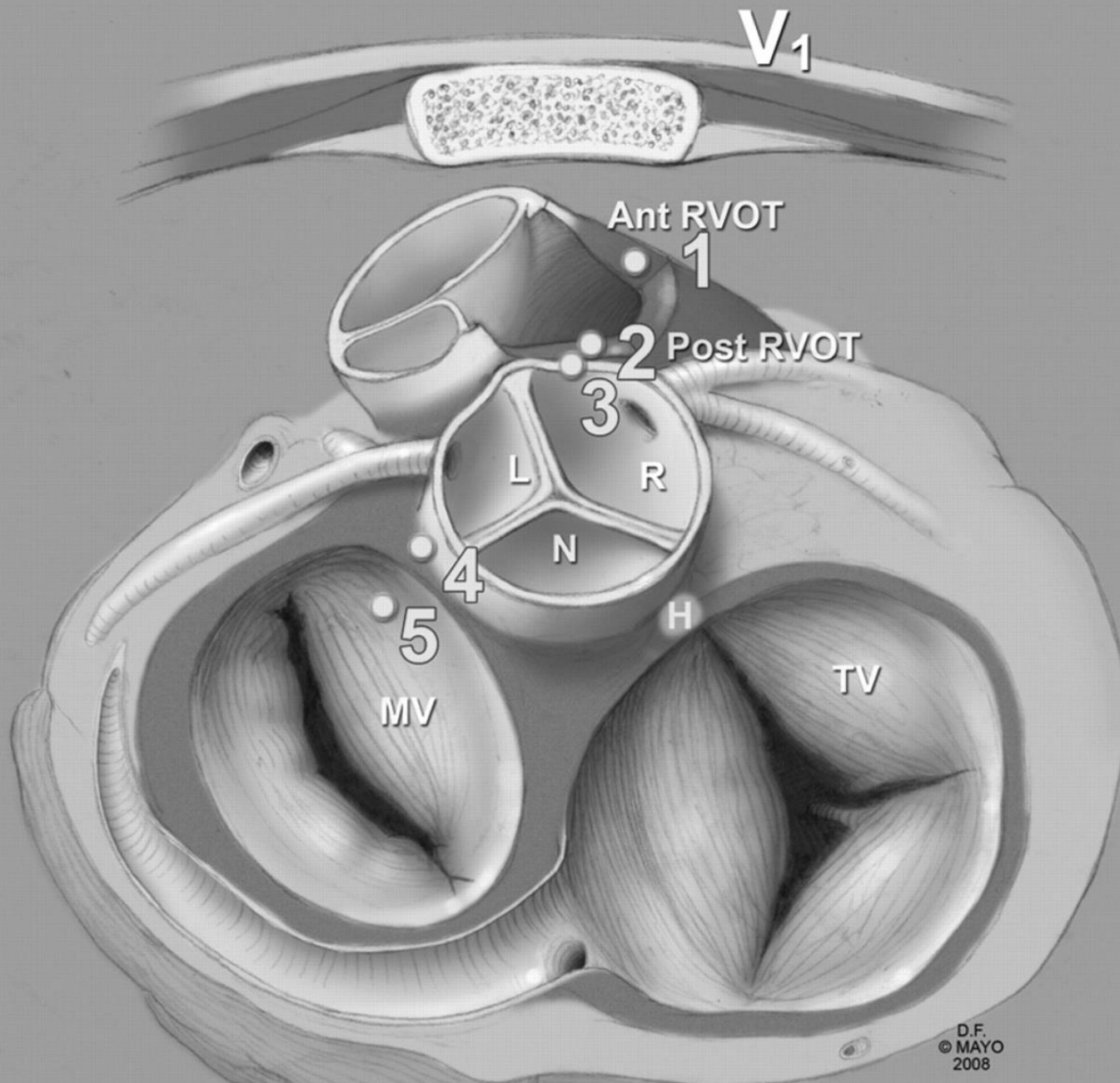
Multiple PVCs, all with a narrow QRS, and a normal QT interval. Next step?



1. Reassurance
2. Calcium Ch Blocker
3. Amiodarone
4. Ablation
5. Defibrillator

Location?

1. RVOT
2. Aortic Cusp
3. Aorto-Mitral Contin
4. Mitral Annulus
5. Ant Intervent Vein



Niloufar Tabatabaei, and Samuel J. Asirvatham *Circ Arrhythm Electrophysiol.* 2009;2:316-326

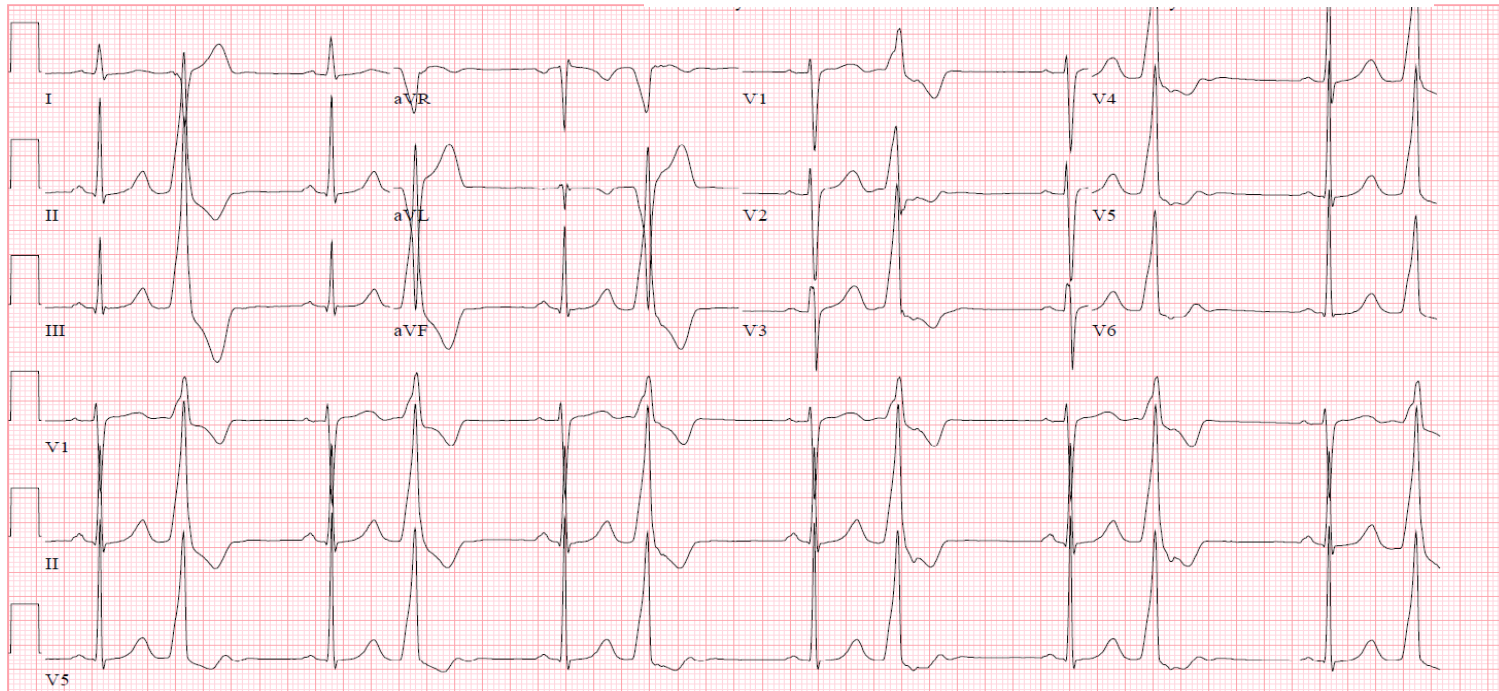
Case

- 45 y/o man with HTN, and frequent moderately symptomatic PVCs, despite beta-blockers.
- Successful catheter ablation at posterior septal RVOT



Case

- 22 y/o woman referred for “bradycardia”
- Found to have bigeminy
- PVC burden on Holter = 28%



Case

- 22 y/o woman referred for “bradycardia”
- Found to have bigeminy
- PVC burden on Holter 28%
- Morphology RBIA, negative in I

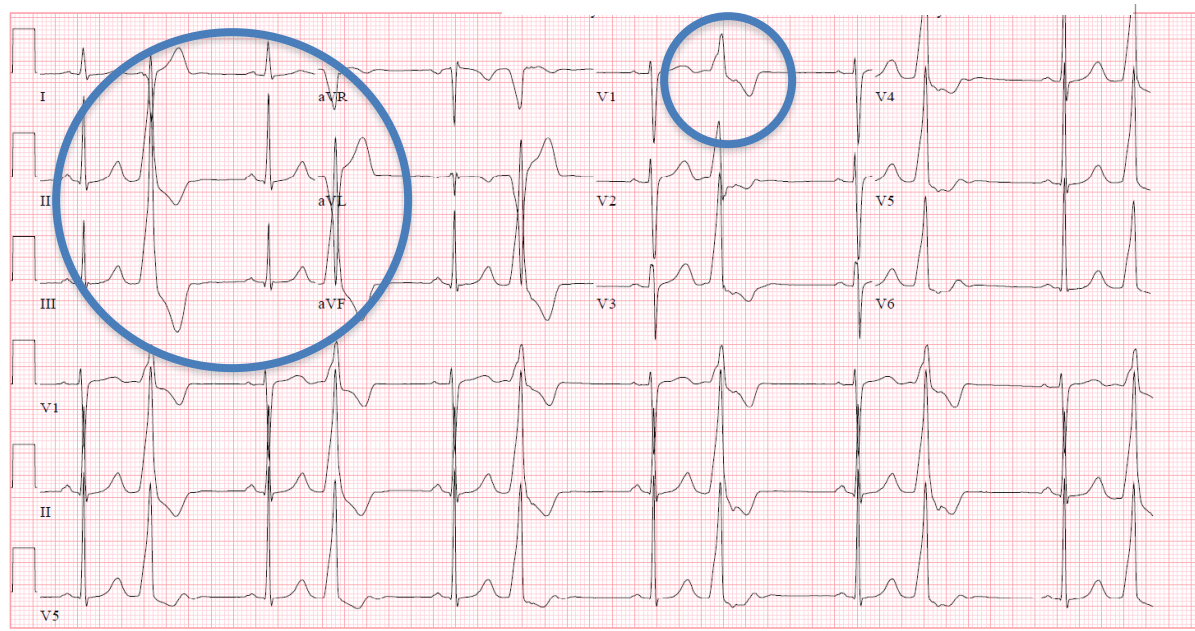
- Echo/MRI EF 50%, mild LV dil. No scar
- Failed trial of beta blockers

Next Step?

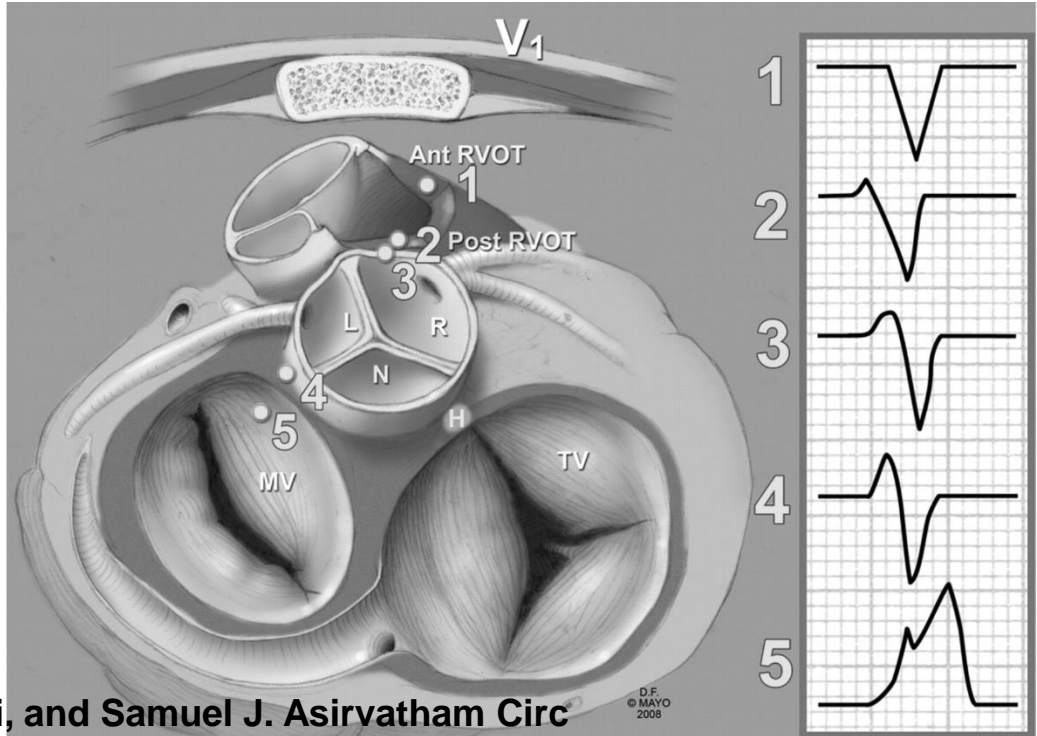
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Location?

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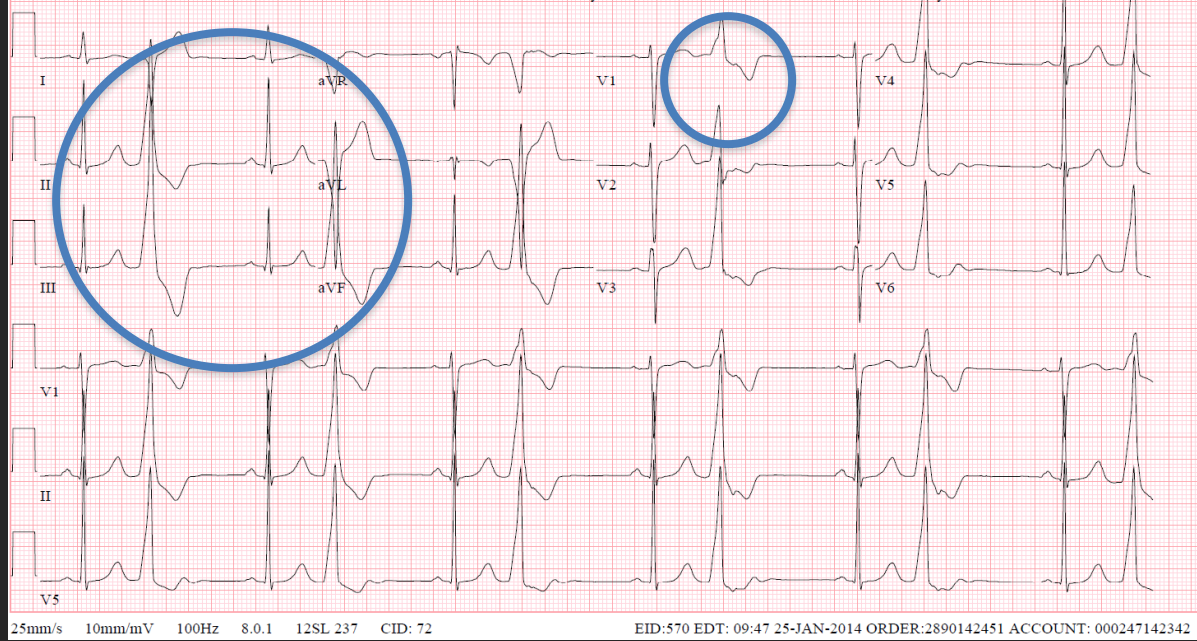


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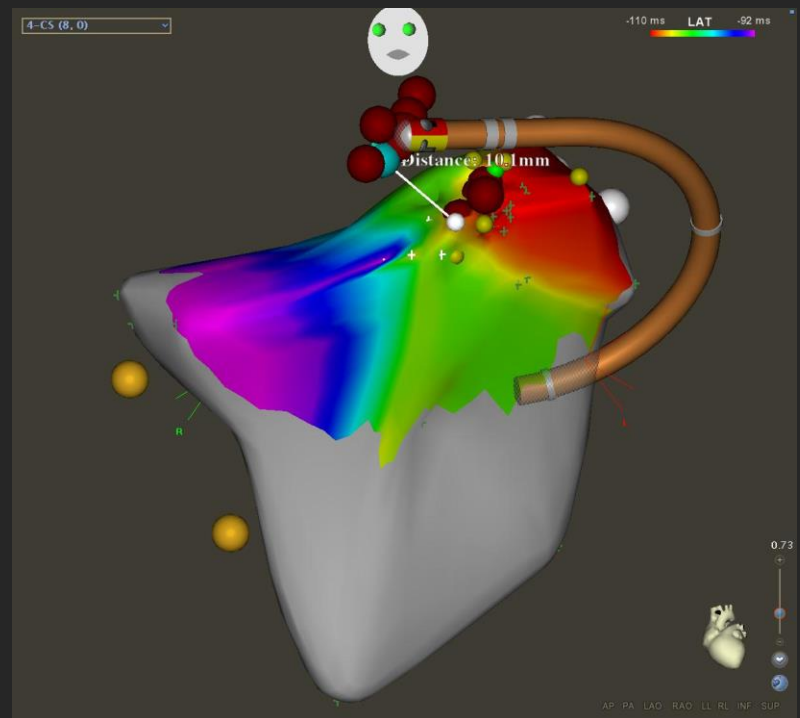
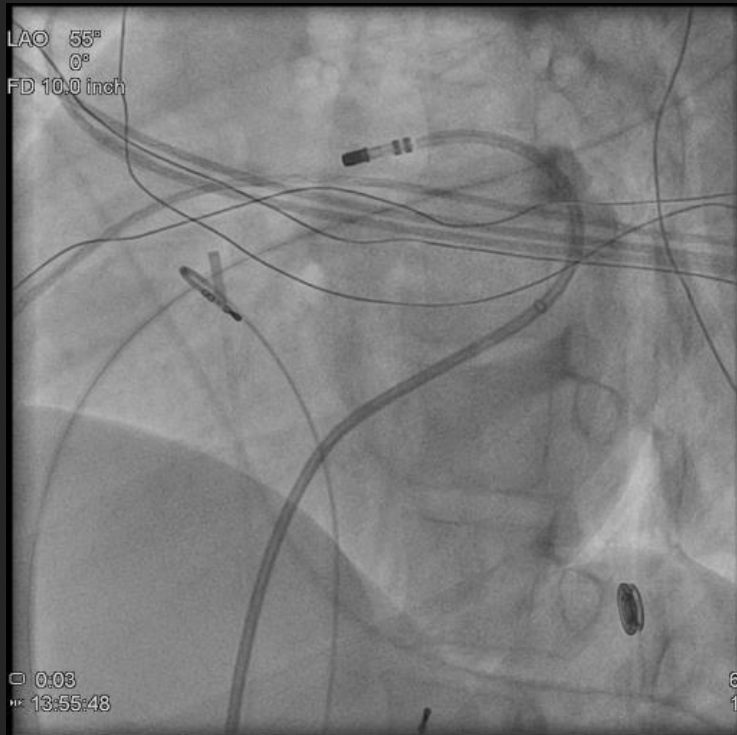
Niloufar Tabatabaei, and Samuel J. Asirvatham *Circ Arrhythm Electrophysiol.* 2009;2:316-326

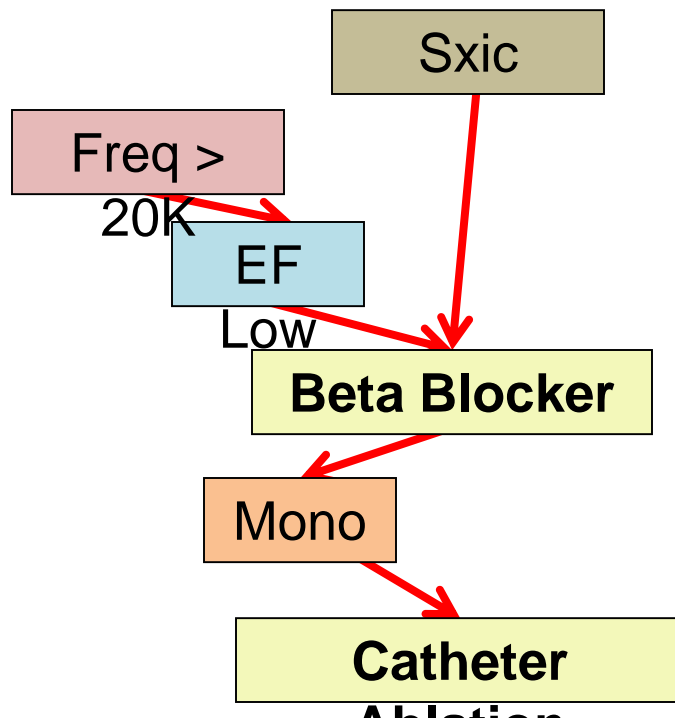
D.F. MAYO 2008



25mm/s 10mm/mV 100Hz 8.0.1 12SL 237 CID: 72

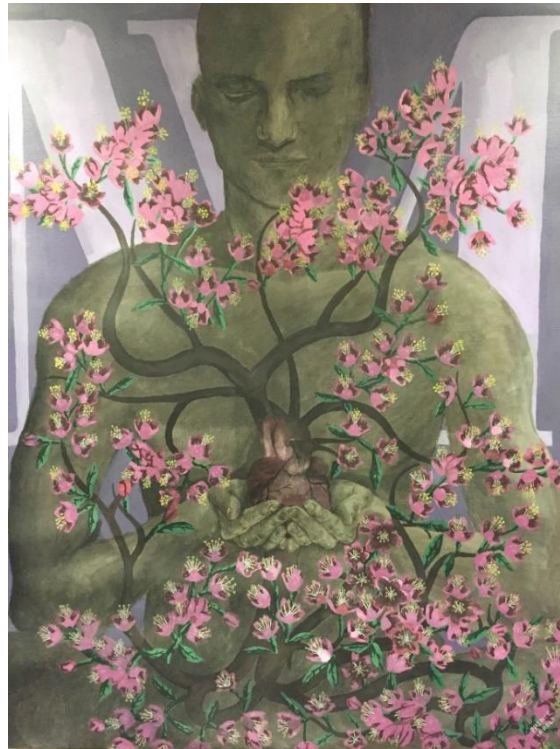
EID:570 EDT: 09:47 25-JAN-2014 ORDER:2890142451 ACCOUNT: 000247142342





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bknight@nm.org
[@DrBradleyKnight](https://twitter.com/DrBradleyKnight)