Syncope Simplified

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Moderator

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Clinical Associate Professor of Medicine

SHM Education Committee

Thomas Jefferson University Hospital

COI: Dr. Ackermann reports no conflicts of interest

shm
Society of Hospital Medicine

Attestation Disclosure to the Audience

The activity director(s), planning committee member(s), speaker(s), author(s) or anyone in a position to control the content for **Syncope Simplified**

NO financial interest or relationship which could be perceived as a real or apparent conflict of interest. There were no individuals in a position to control the content that refused to disclose.

Society of Hospital Medicine

Q1

Test

Society of Hospital Medicine

Q2

Test

Society of Hospital Medicine

Syncope Simplified

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Vice President Medical Affairs
Chief Medical Officer at Johns Hopkins Hospital

Lauren Westafer, DO
Assistant Professor, Department of Emergency Medicine and Department for Healthcare Delivery and Population Sciences at Umass , Chan - Baystate

Society of Hospital Medicine

syncope
simplified

Lauren Westafer, DO, MPH, MS
UMass Chan - Baystate

No relevant disclosures

NIH K23HL155895

syncope

syncope

Reflex

Orthostatic

Hemorrhage/anemia
Cardiac
ICH
PE

syncope

Reflex
Orthostatic

was it syncope?

Mistaken for seizure?

Prolonged altered mental status?

Mistaken for trauma?

why?

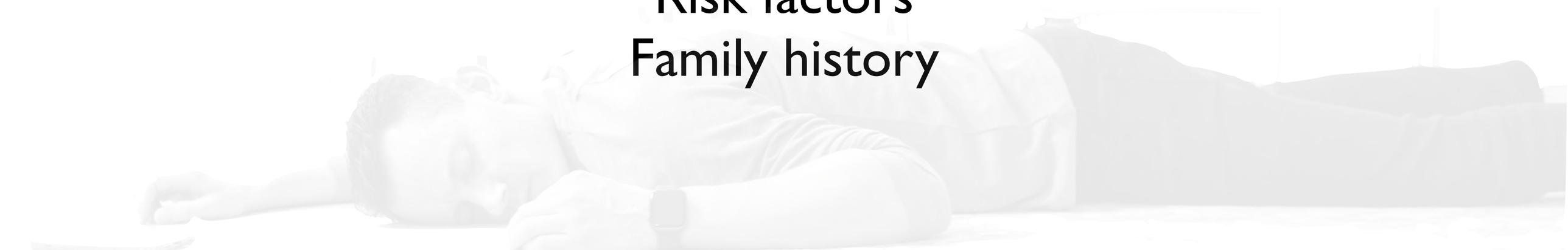
H&P

ECG

Labs etc based on risk

history?

Recent symptoms
Medications
Risk factors
Family history



physical?

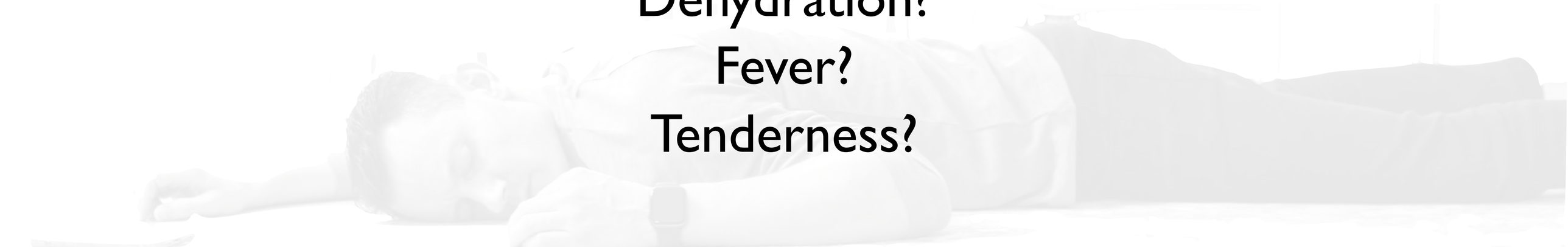
Sick vs no sick

Murmur?

Dehydration?

Fever?

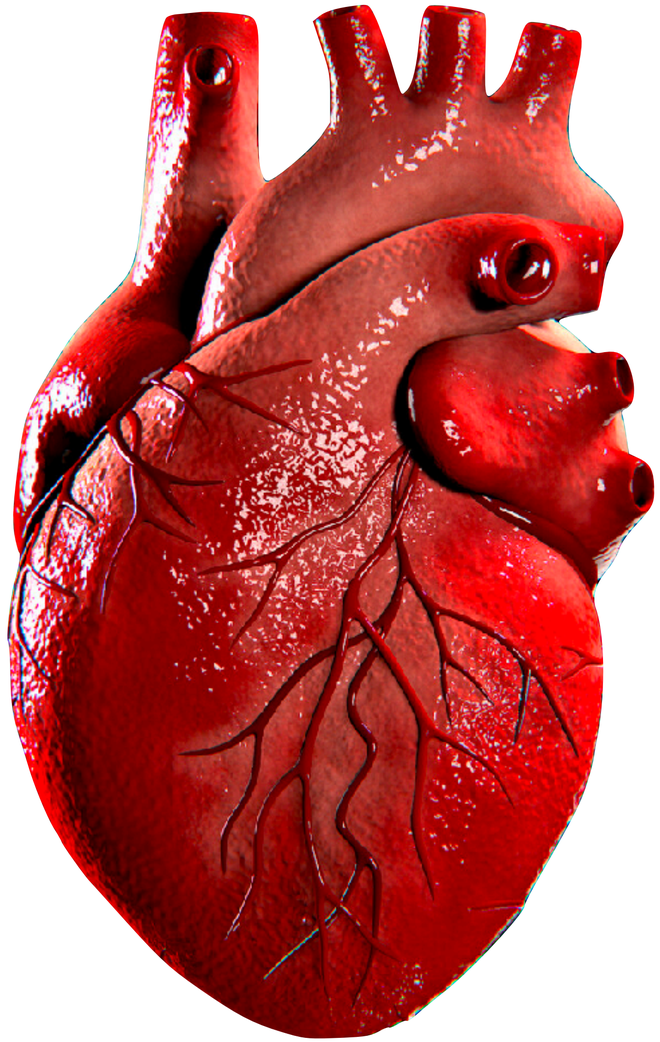
Tenderness?



What else?

Depends on risk factors

Depends on presentation

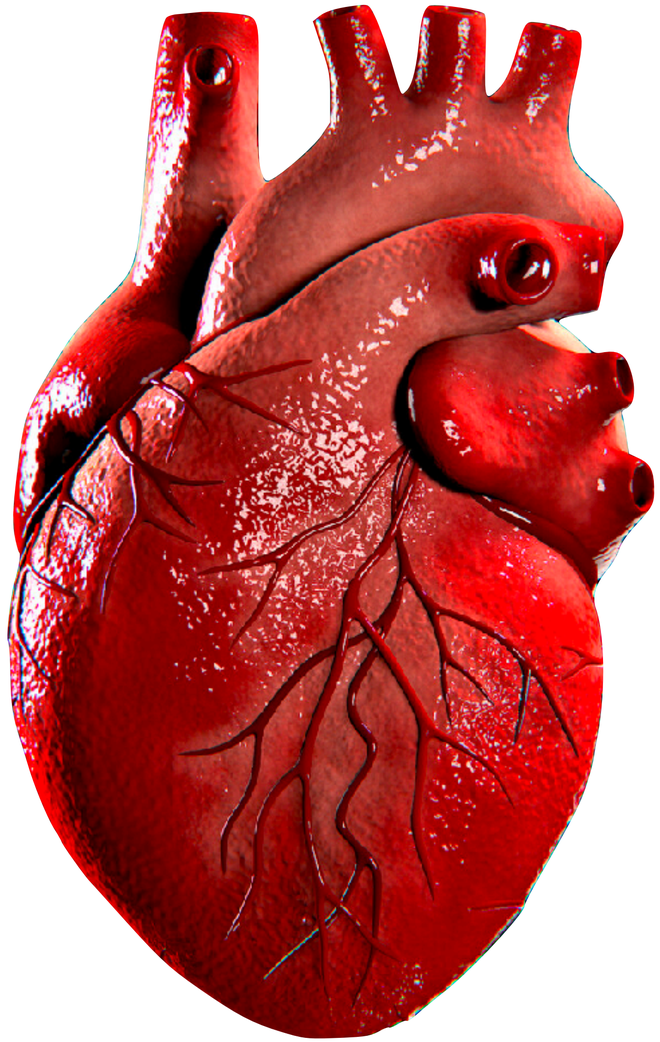


Arrhythmia

Ischemia

Obstruction

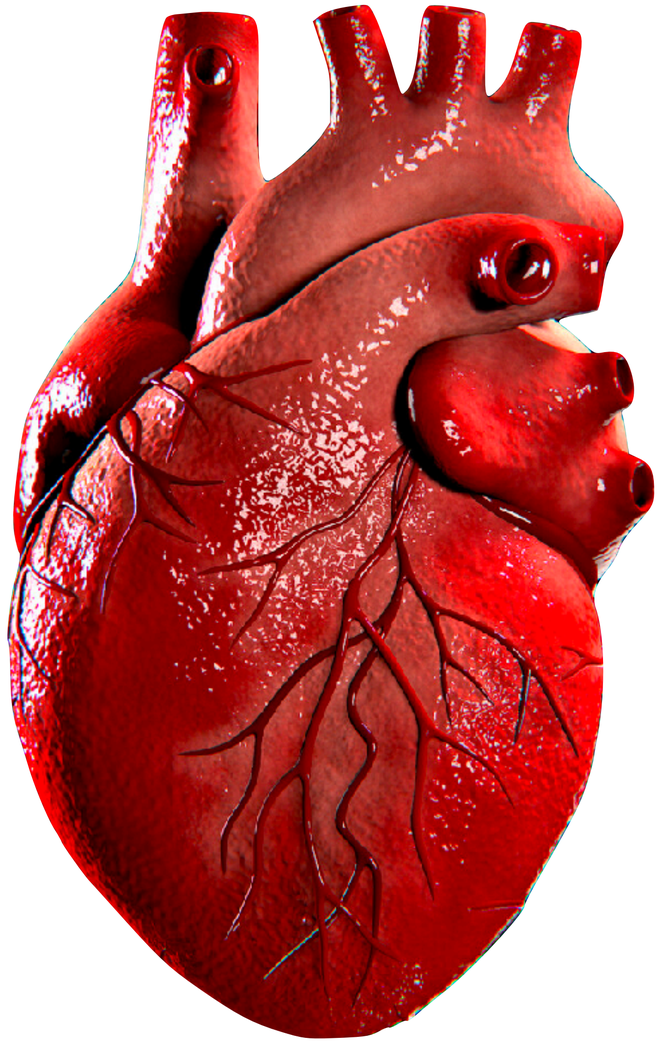
Tamponade, PE, aortic stenosis



ECG

Consider POCUS

+/- other labs/imaging



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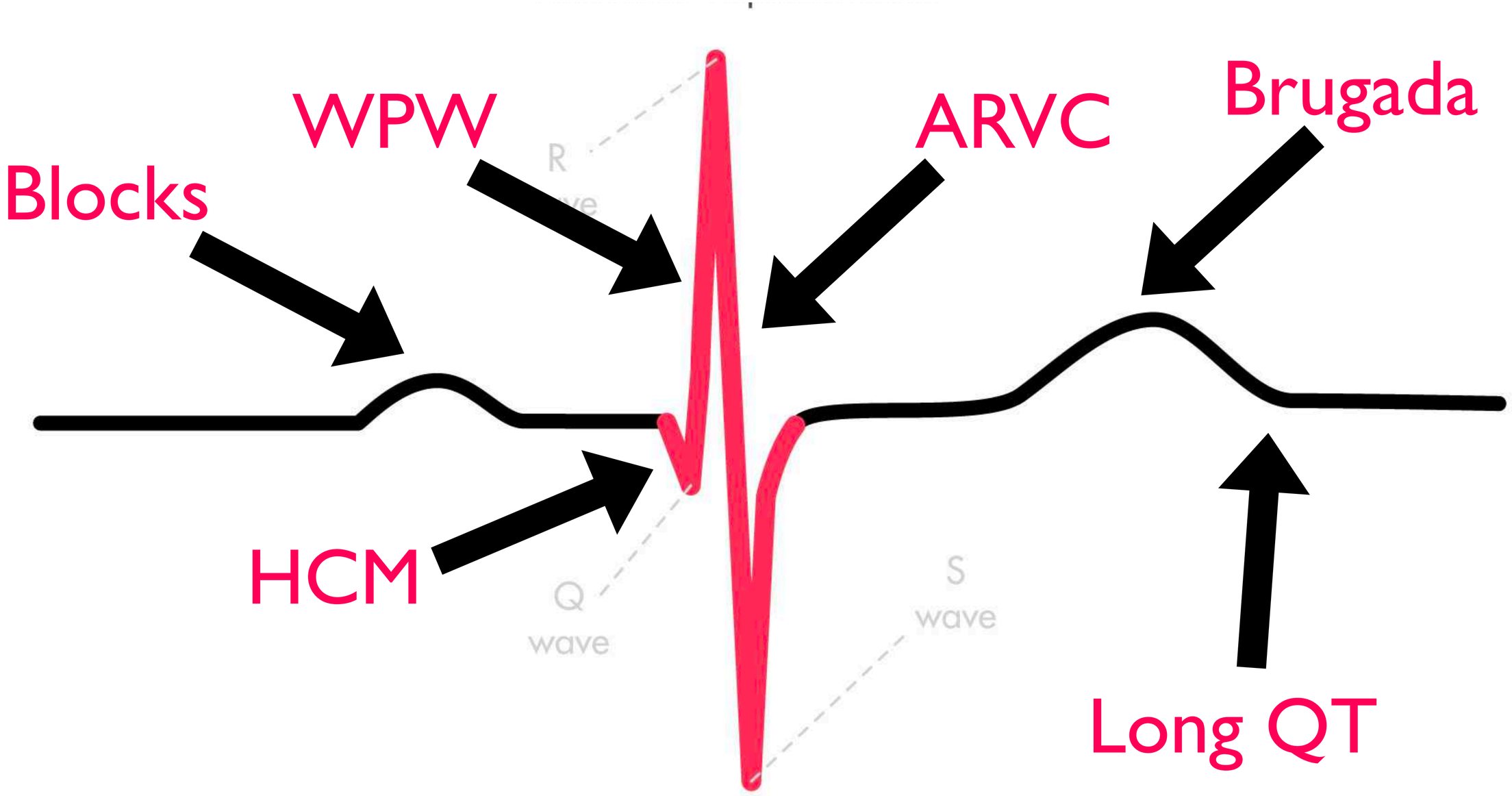
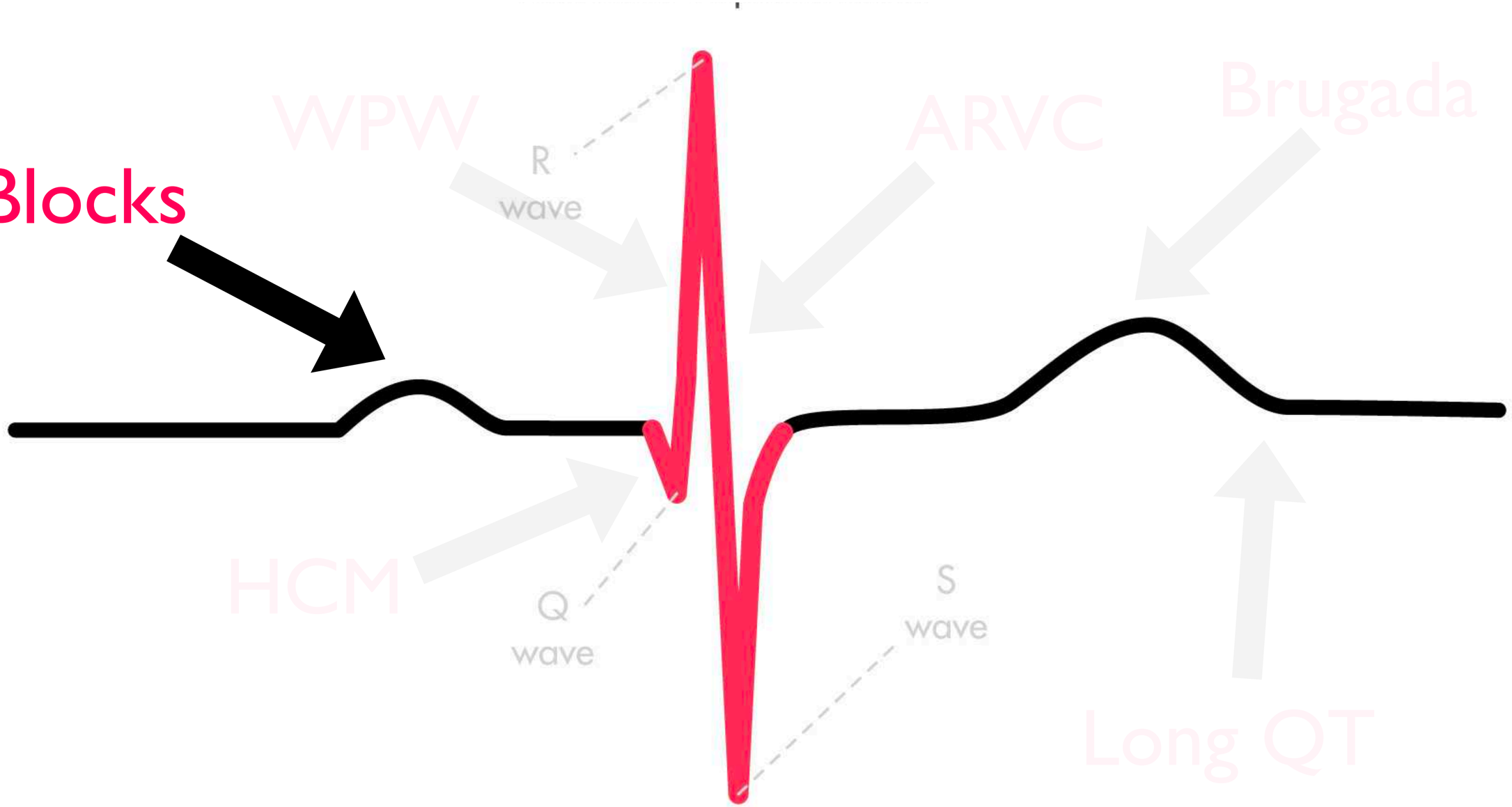

Blocks
WPW
ARVC
Brugada
HCM
Long QT
R
wave
Q
wave
S
wave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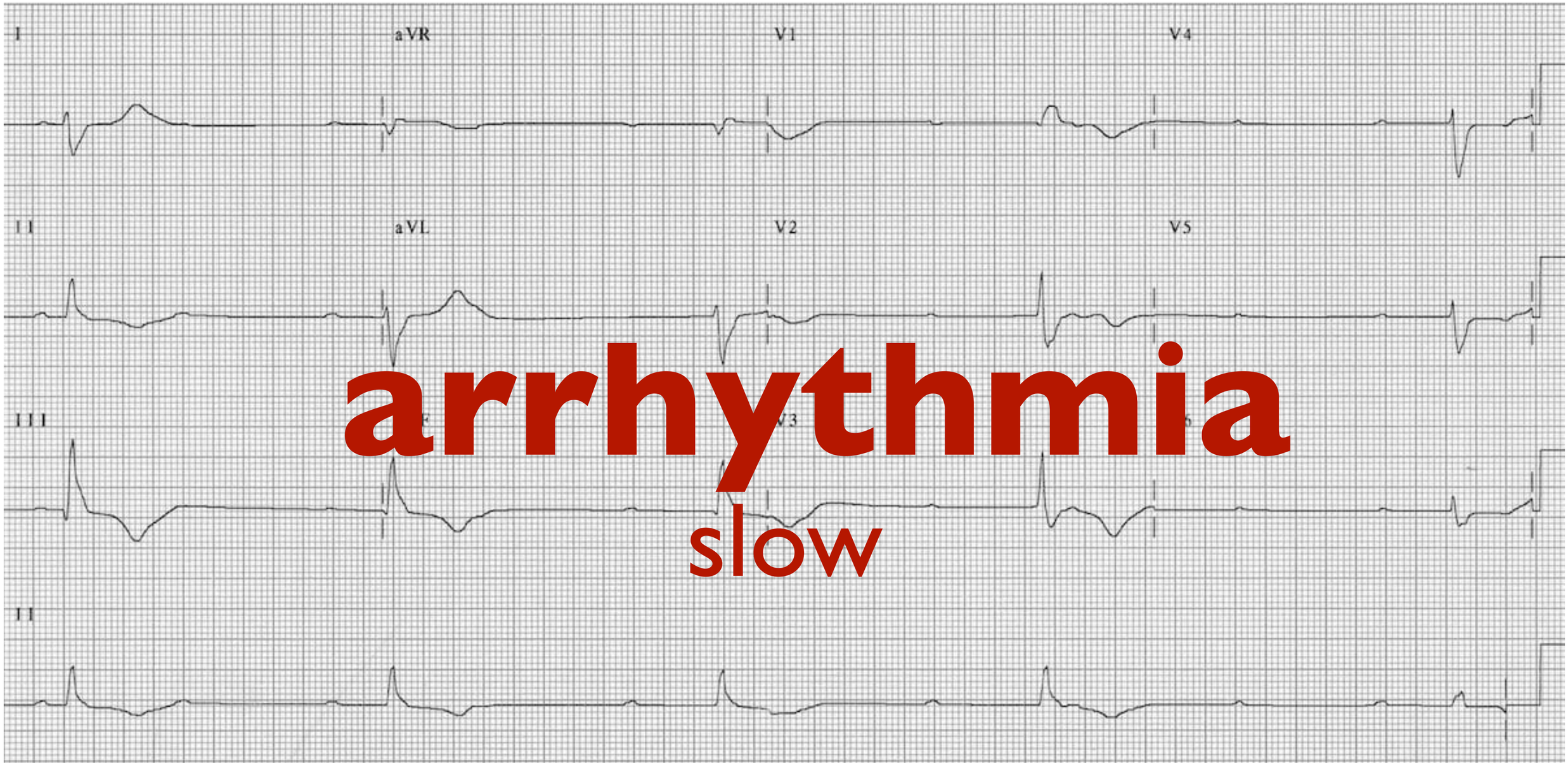
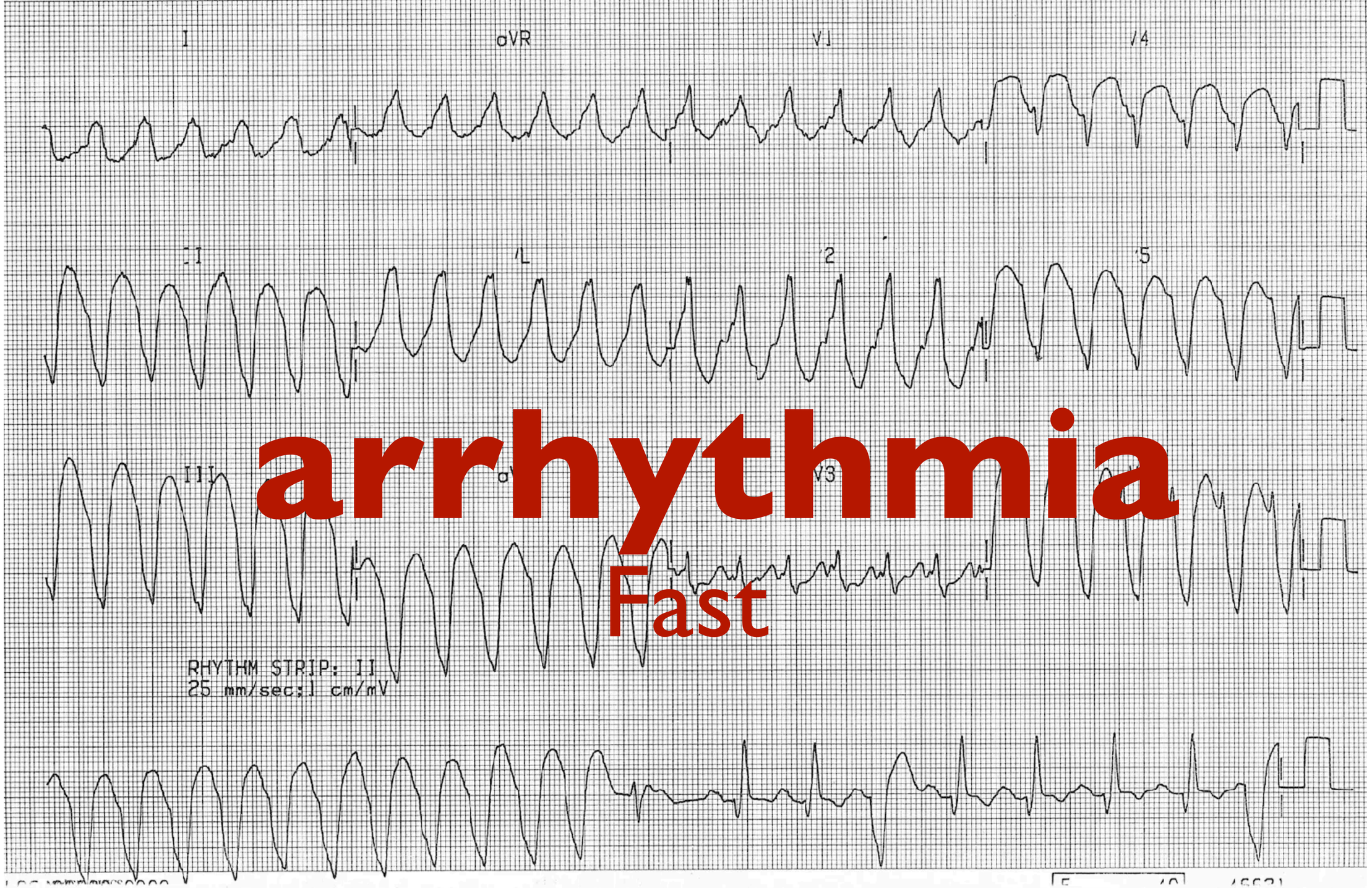


arrhythmia

slow

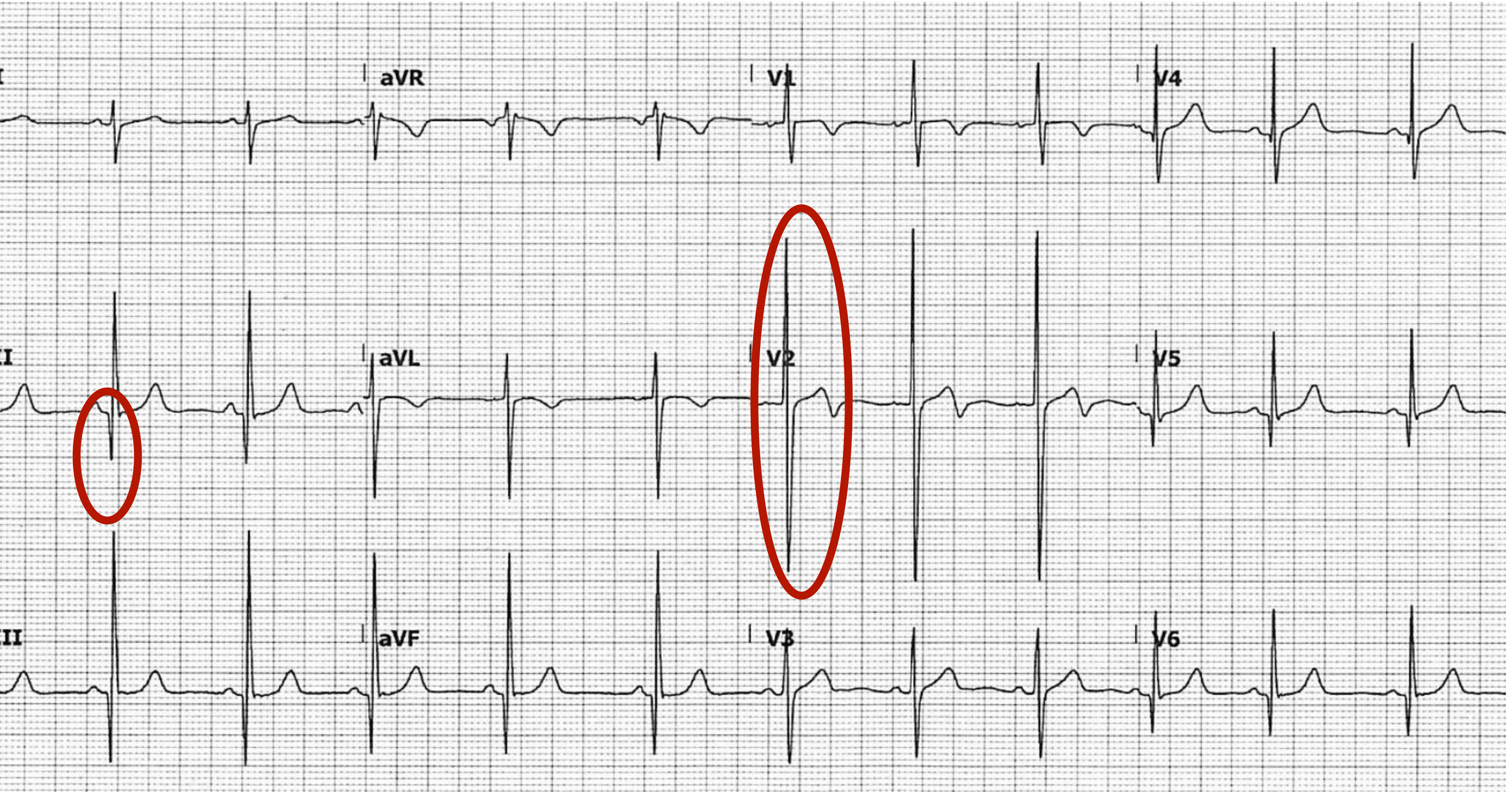


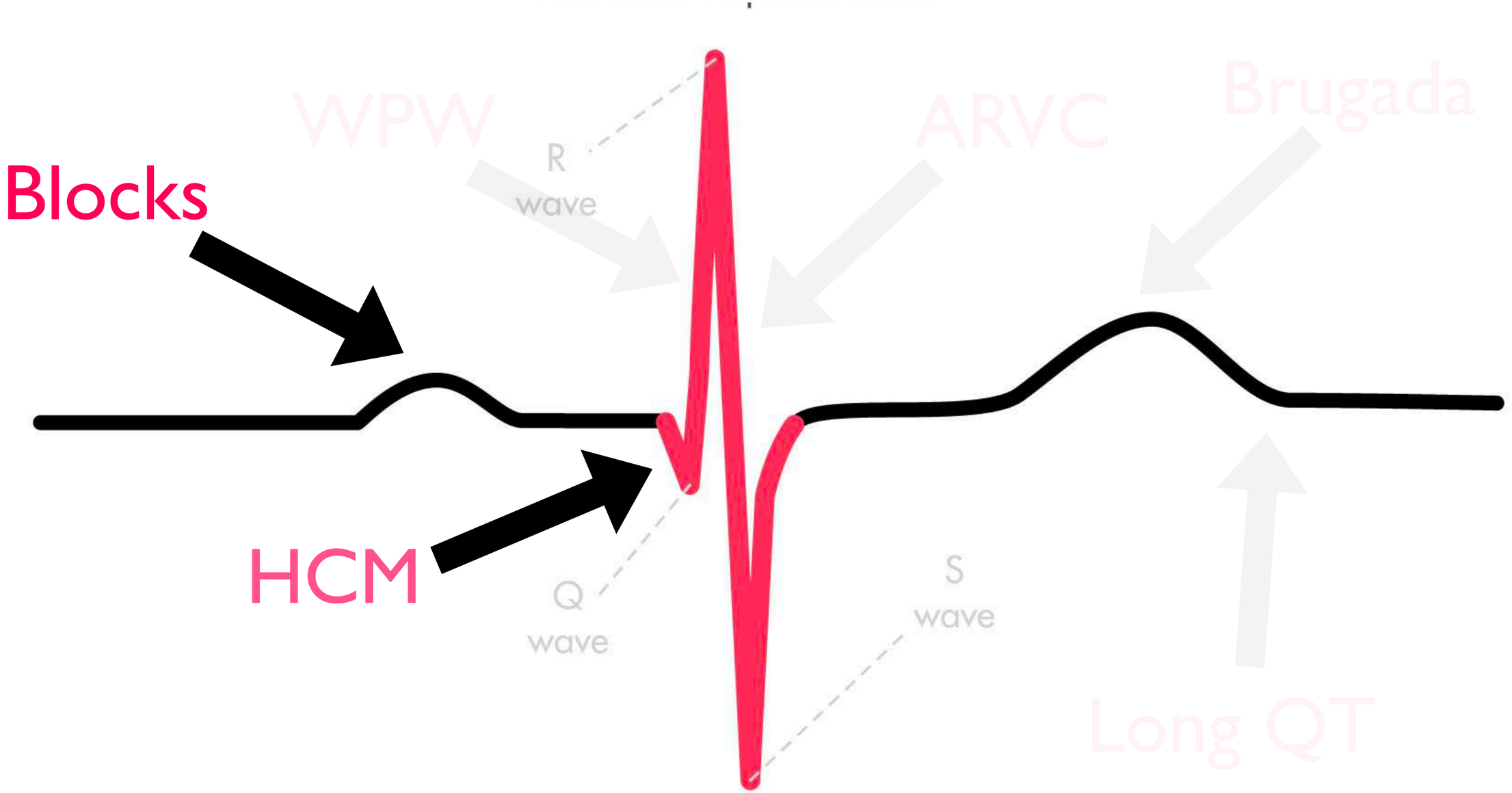
arrhythmia

Fast

arrhythmia

paroxysmal


aVR
V1
V4
aVL
V2
V5
aVF
V3
V6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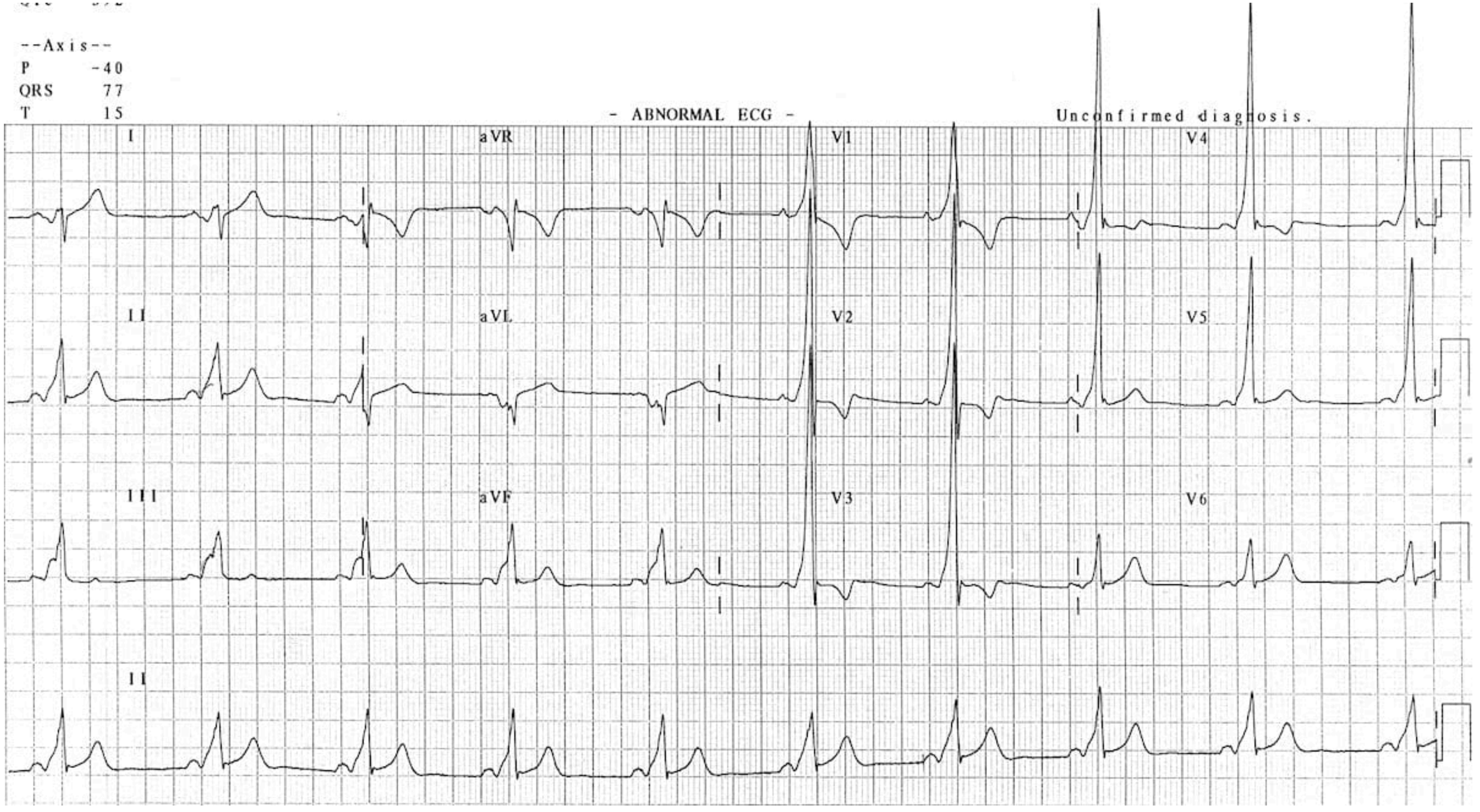
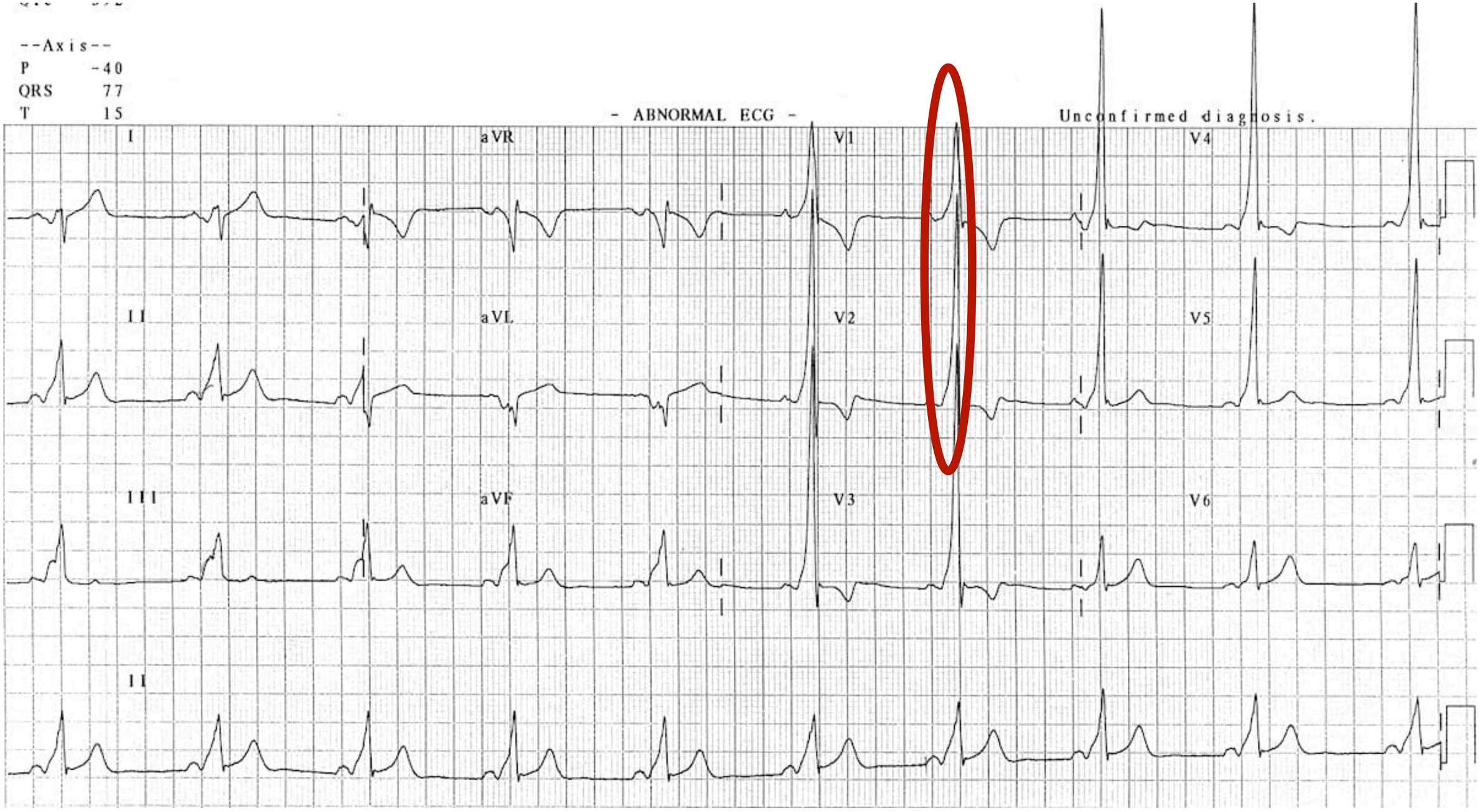
Long QT


--Axis--
P -40
QRS 77
T 15
- ABNORMAL ECG -
Unconfirmed diagnosis.
I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
II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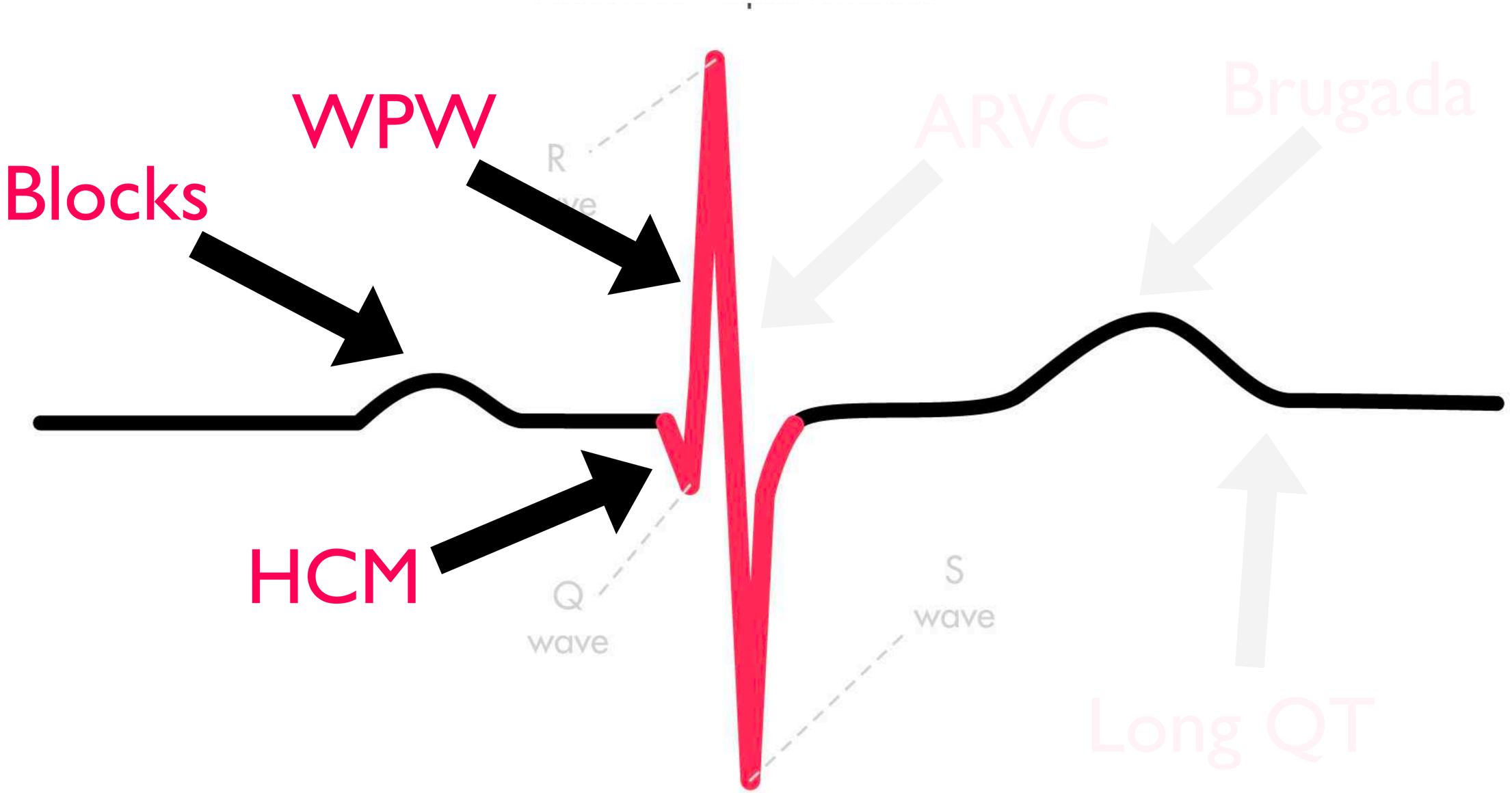
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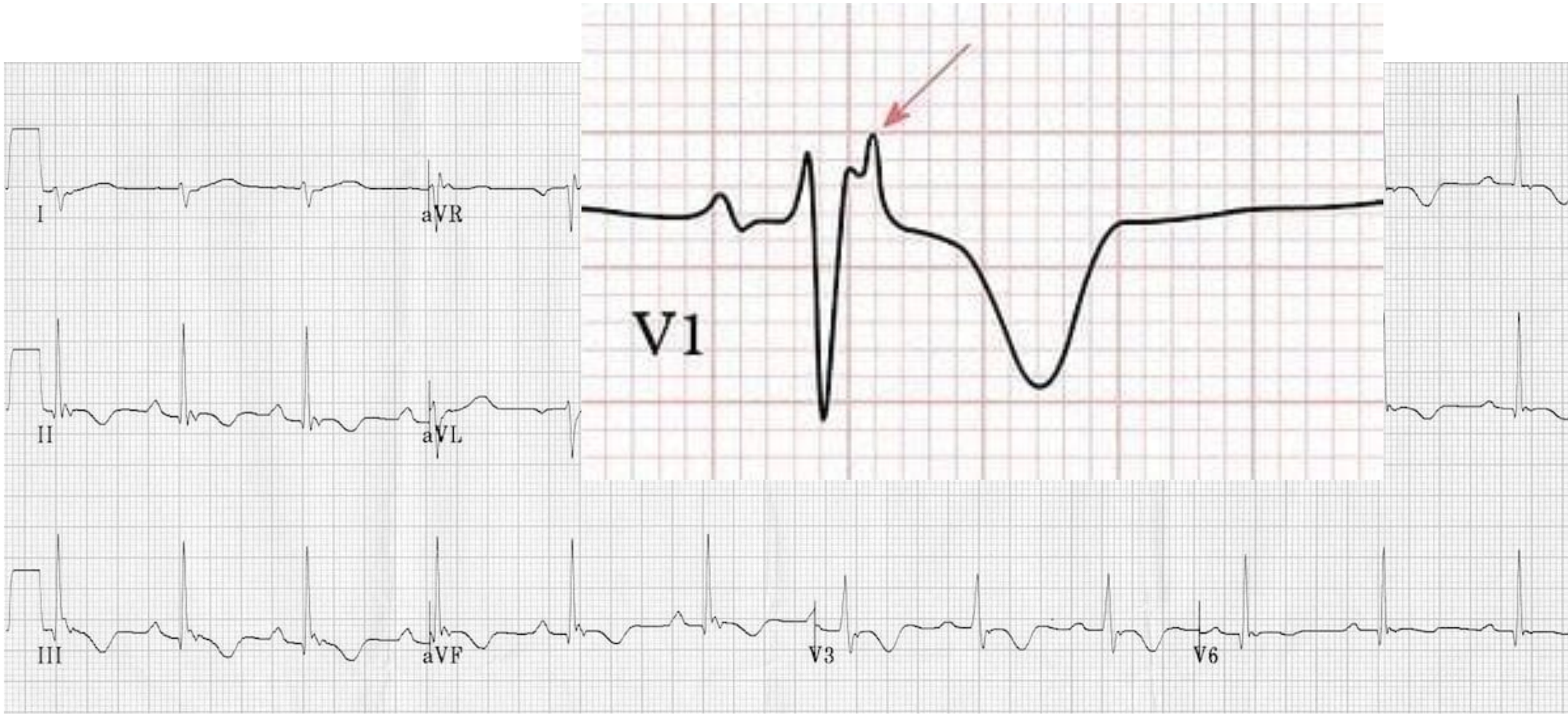
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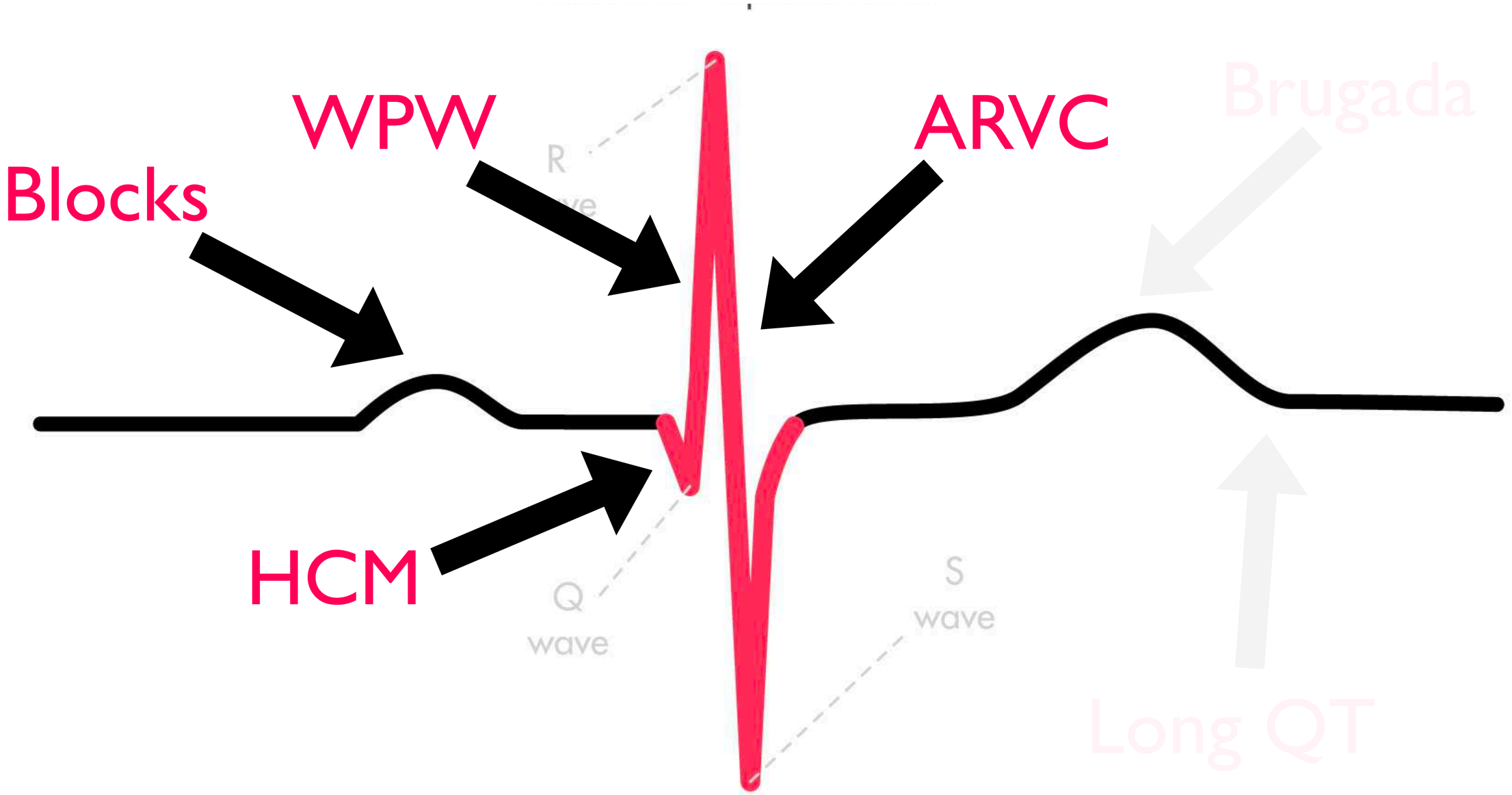
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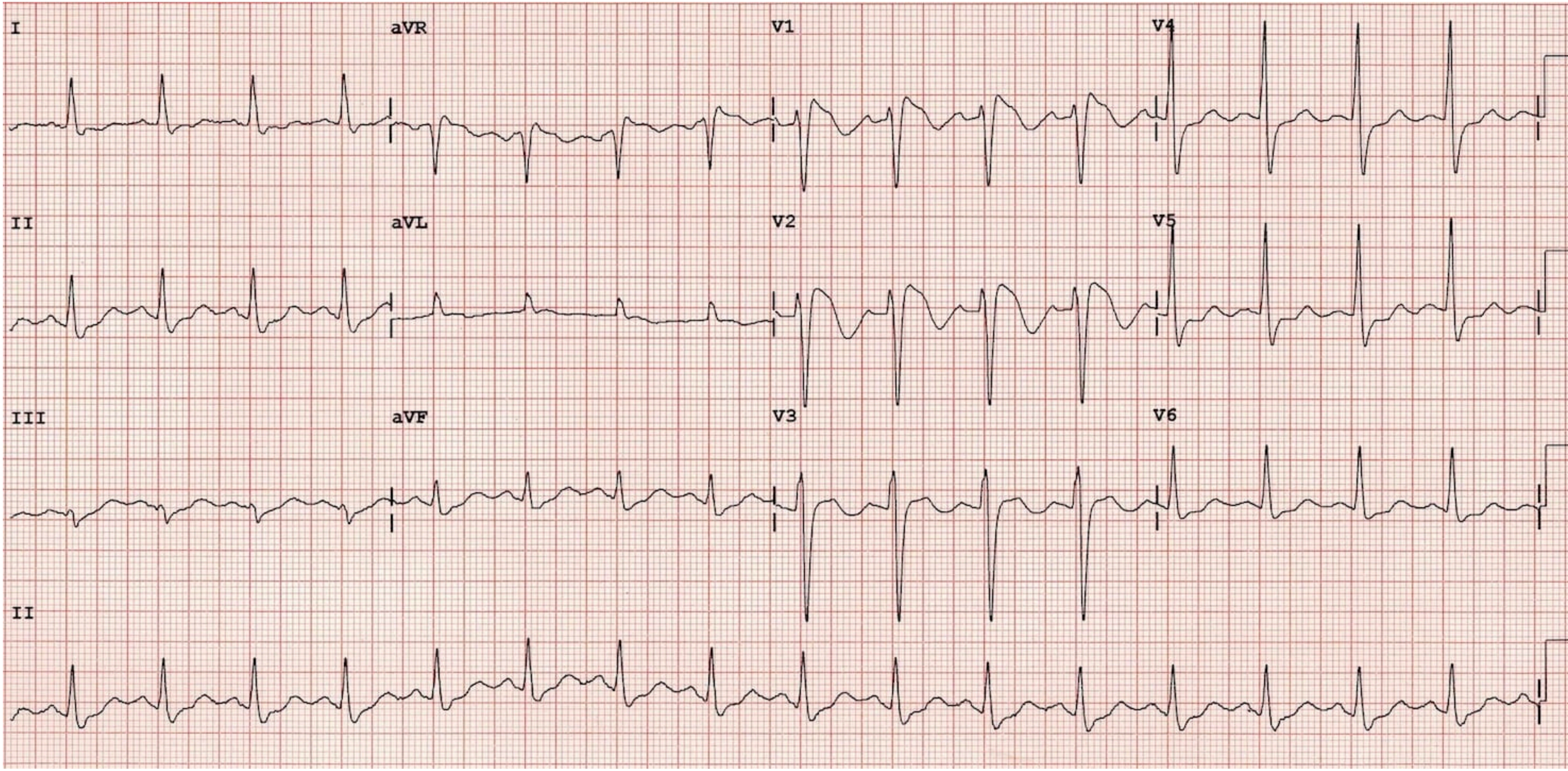
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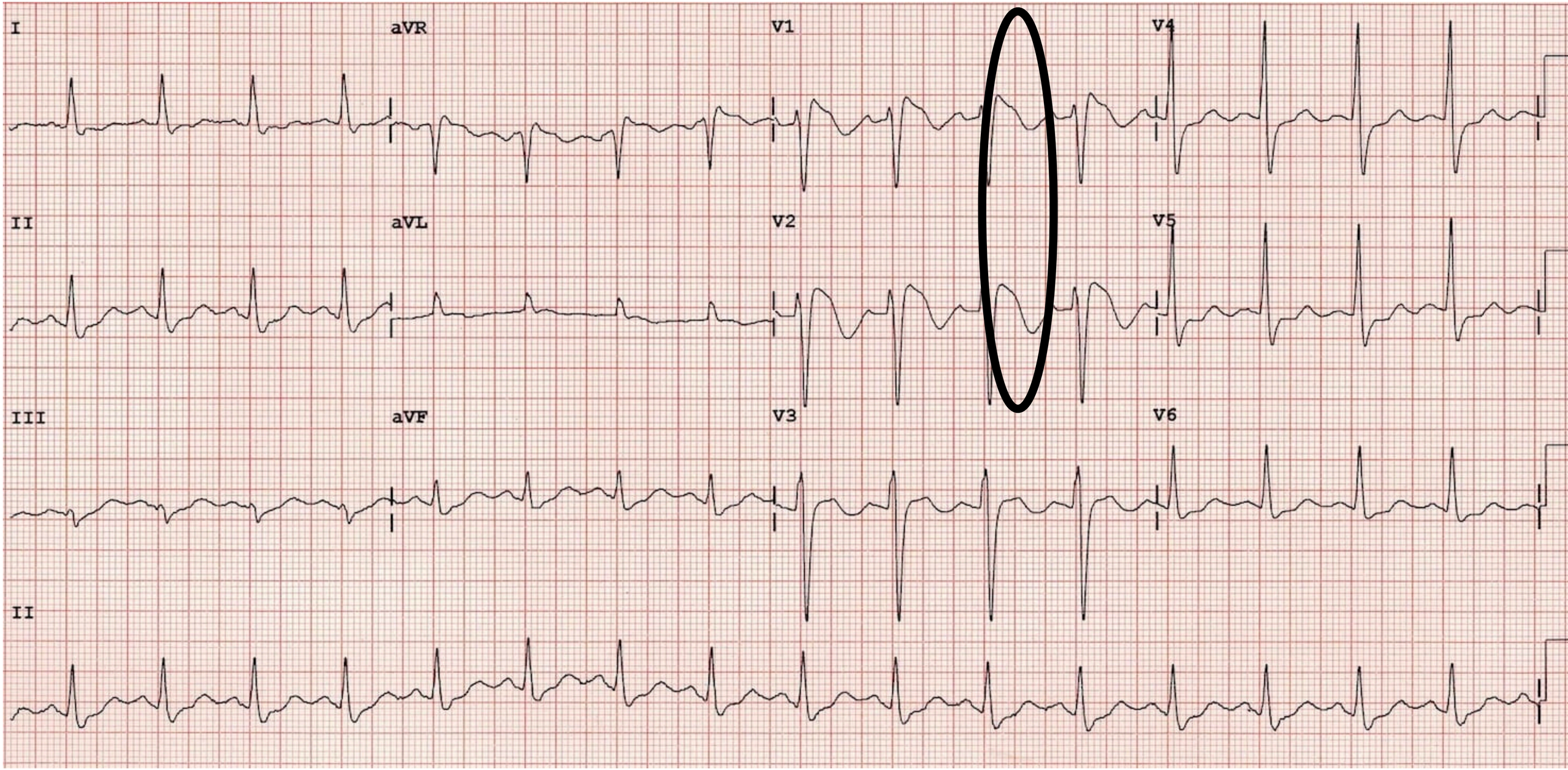
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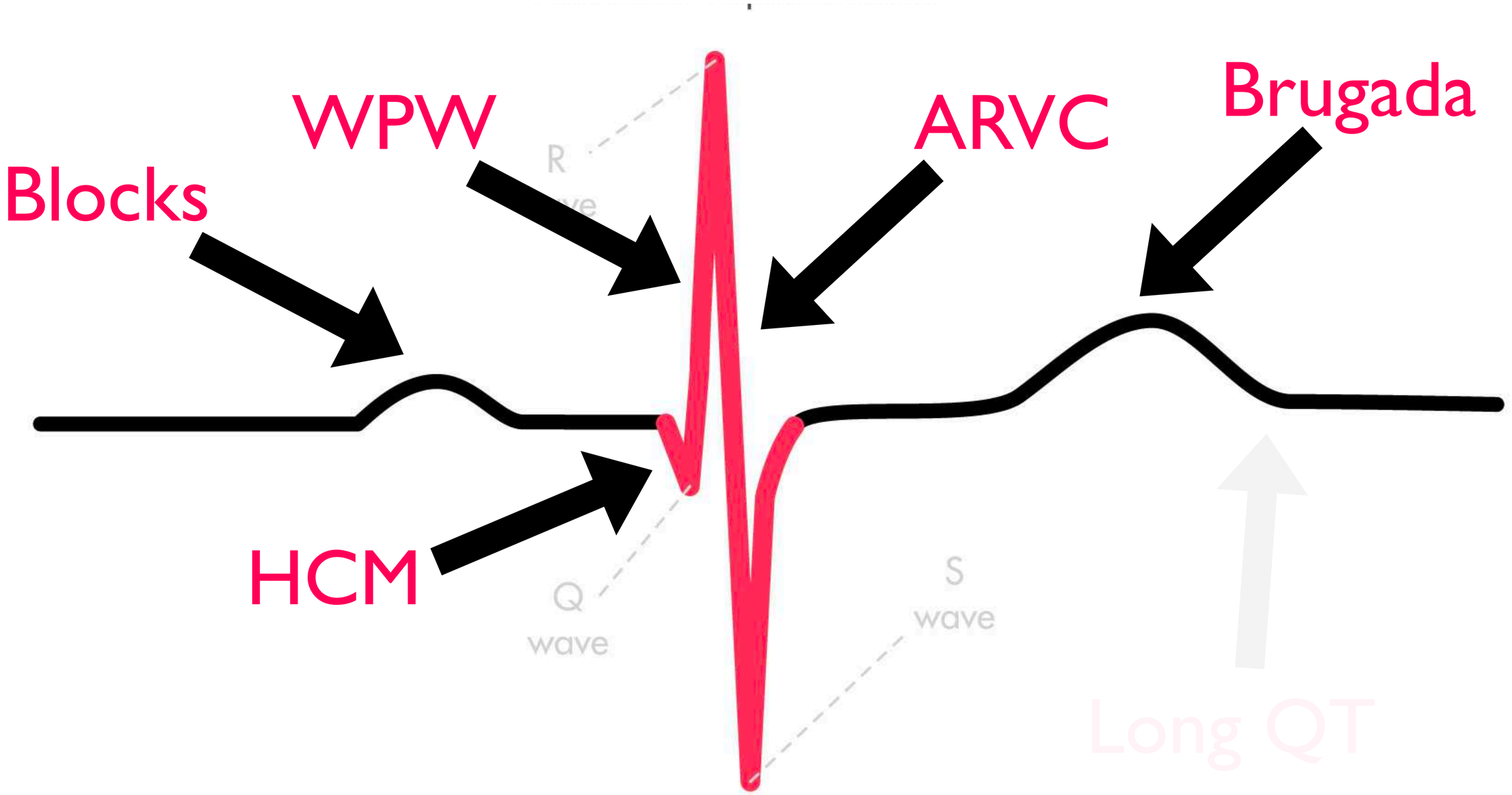
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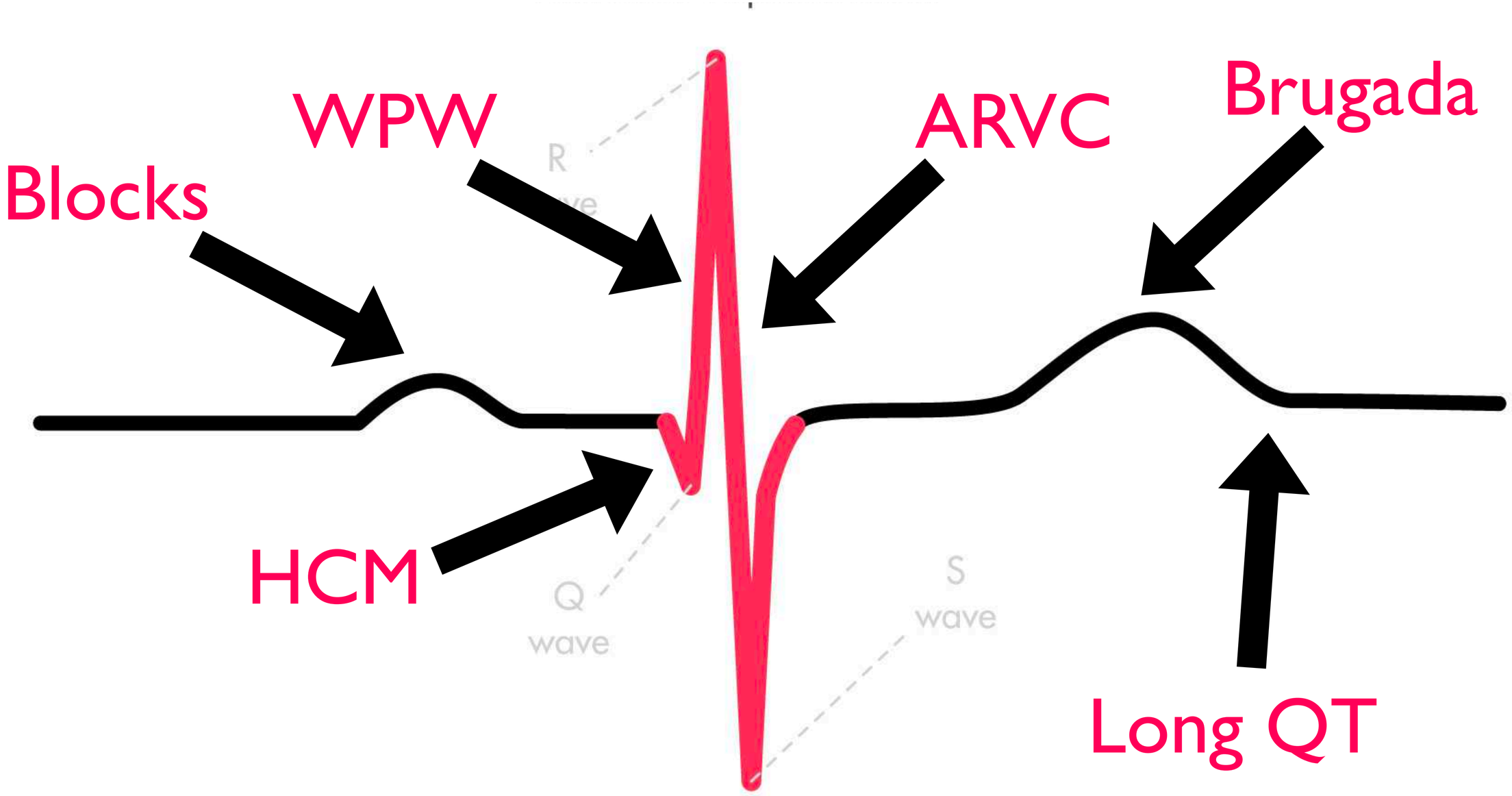
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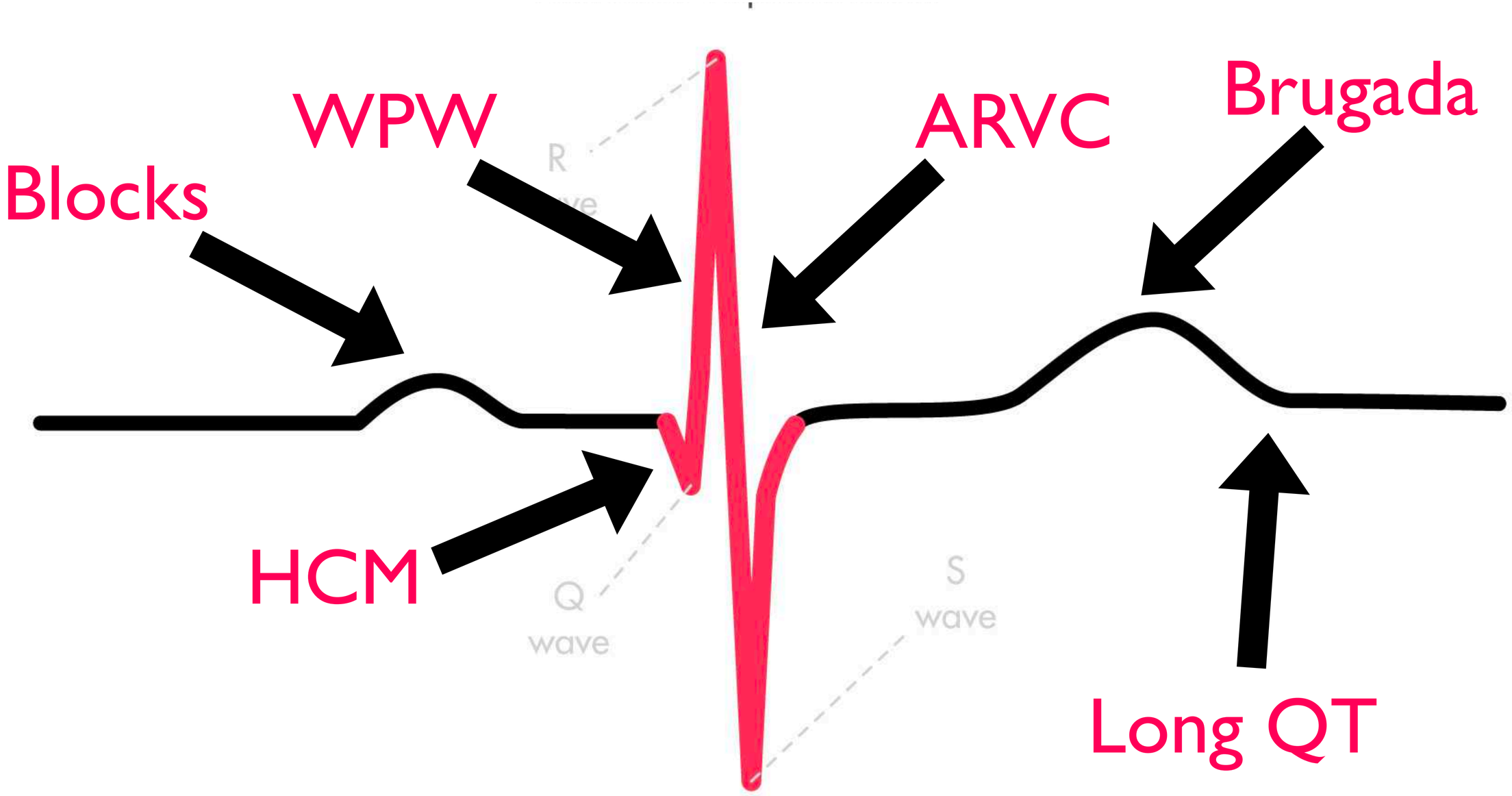
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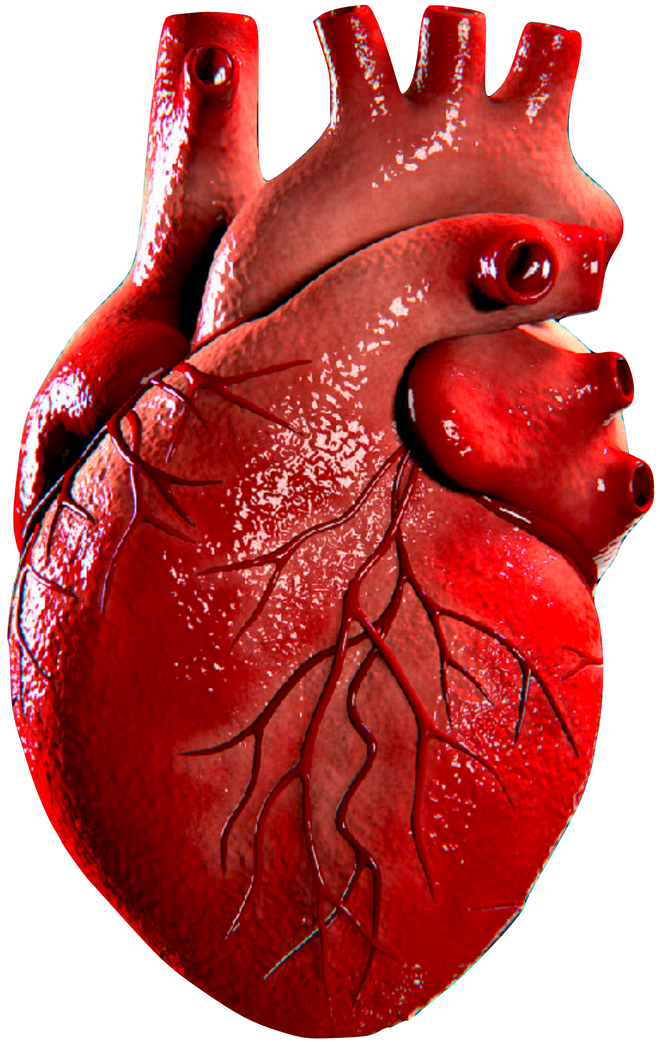
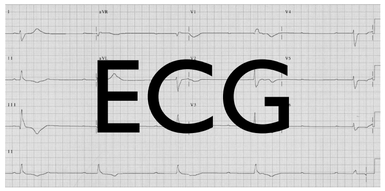
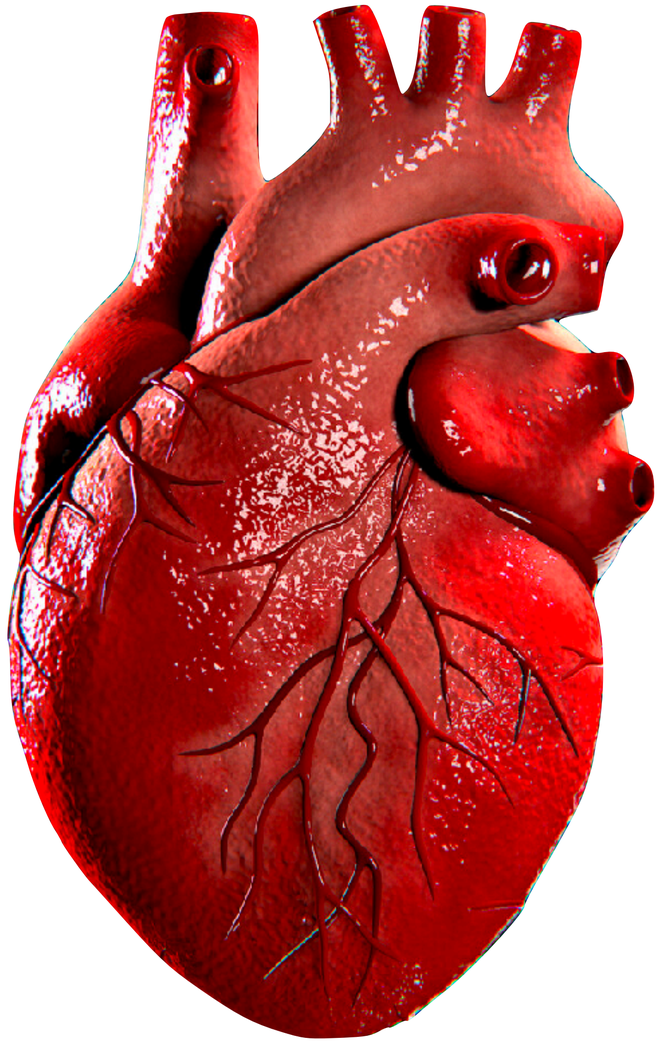


ECG pitfall

changes can be **transient**

Syncope

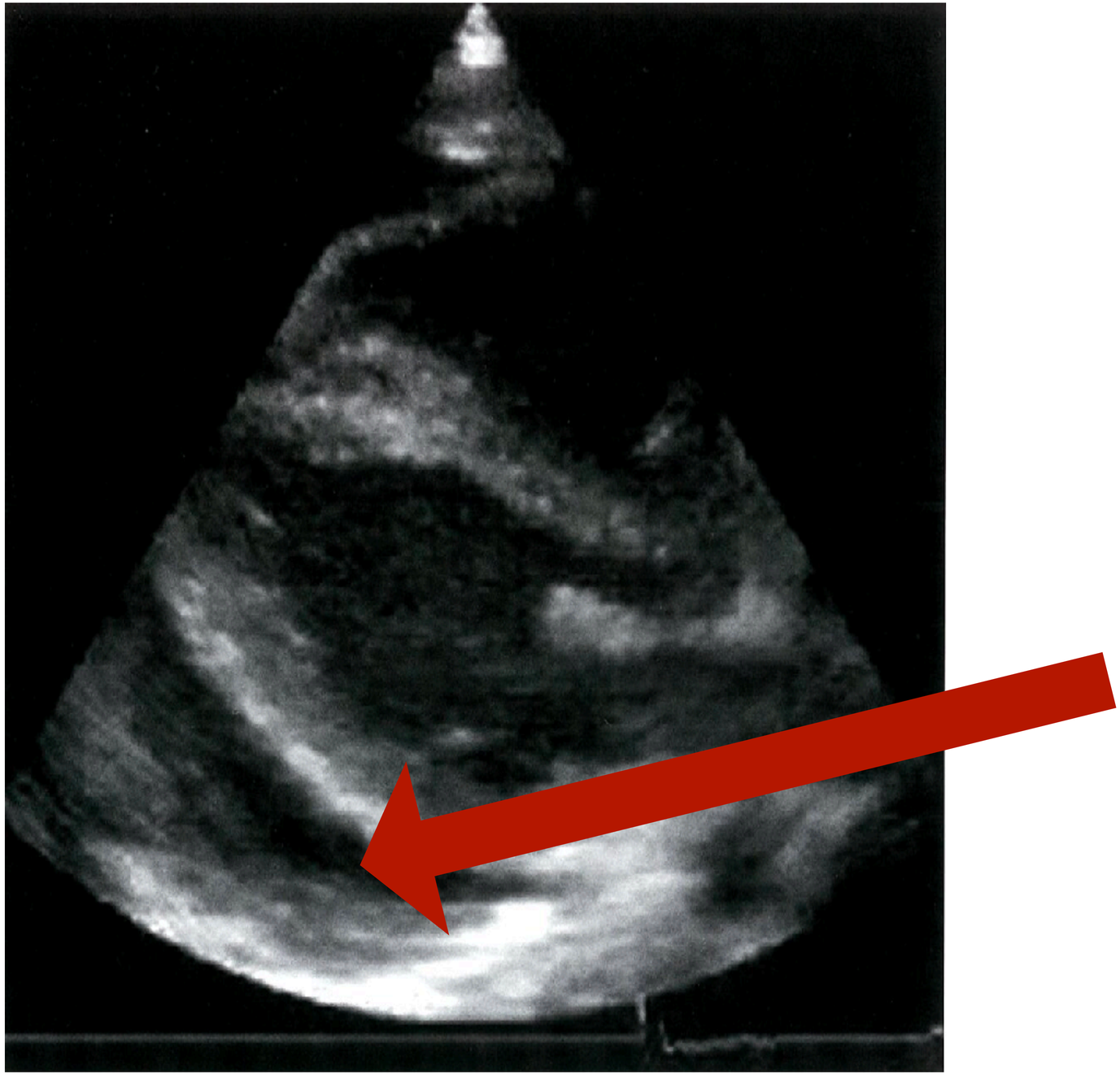




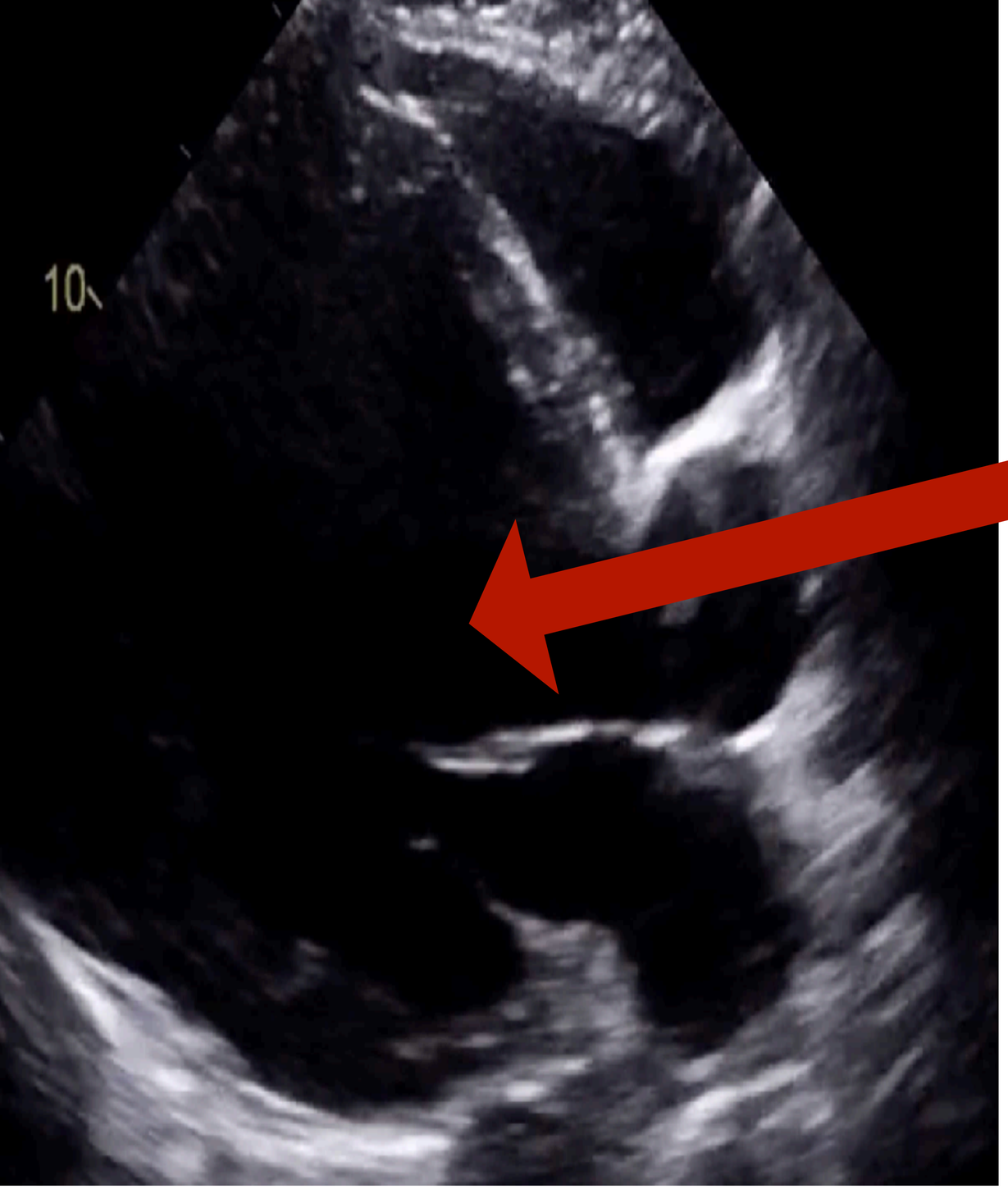
ECG

Consider POCUS

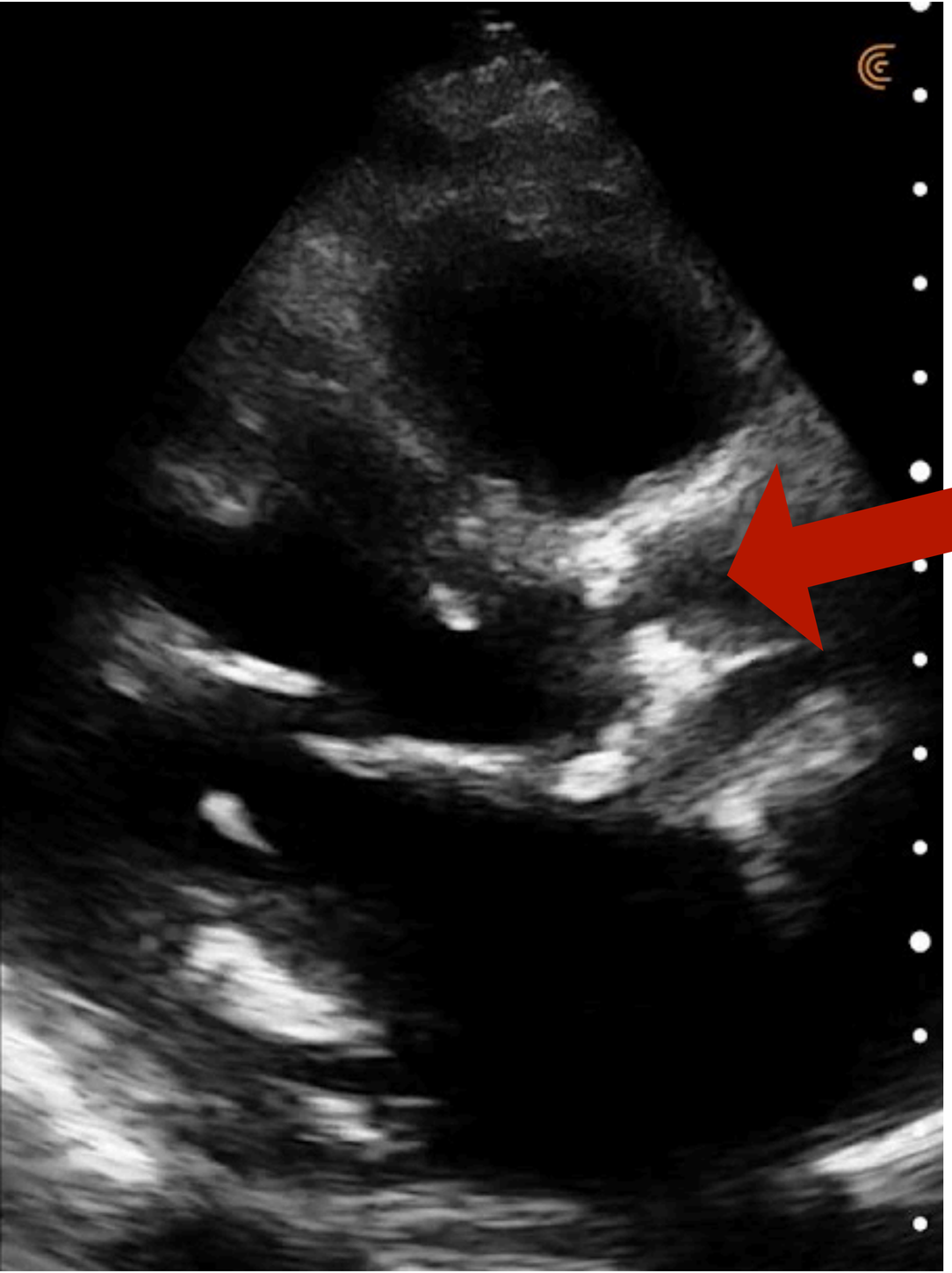
+/- other labs/imaging



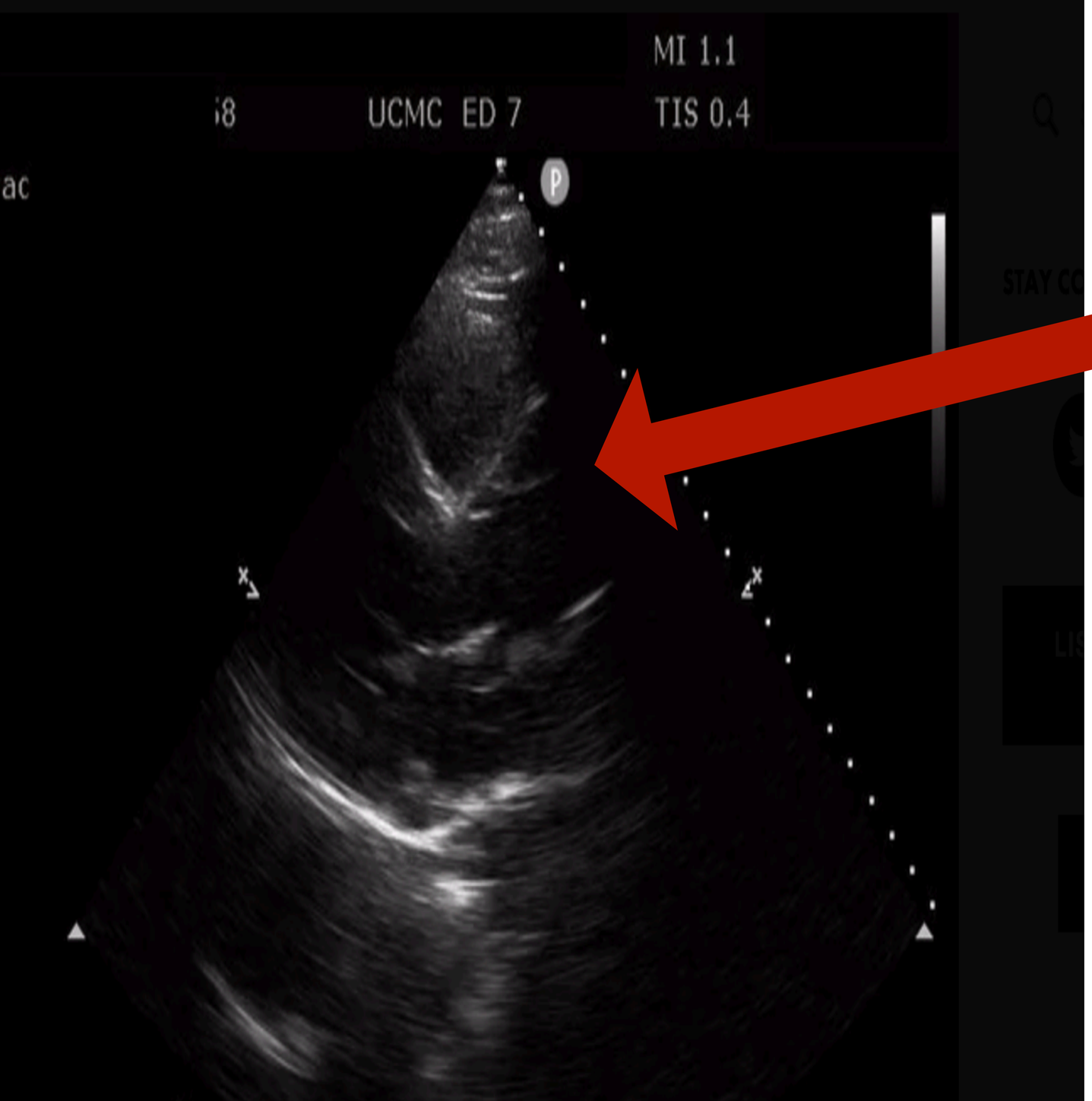
Pericardial effusion



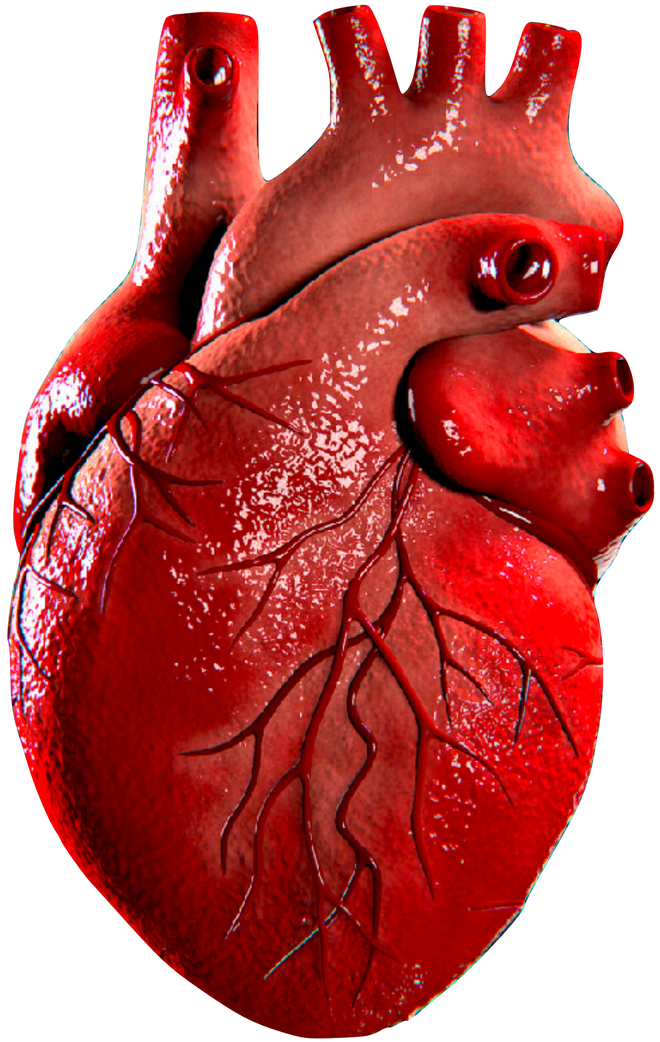
Cardiomyopathy



Aortic stenosis



Aortic dissection

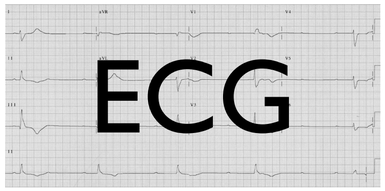


ECG

Consider POCUS

+/- other labs/imaging

Syncope

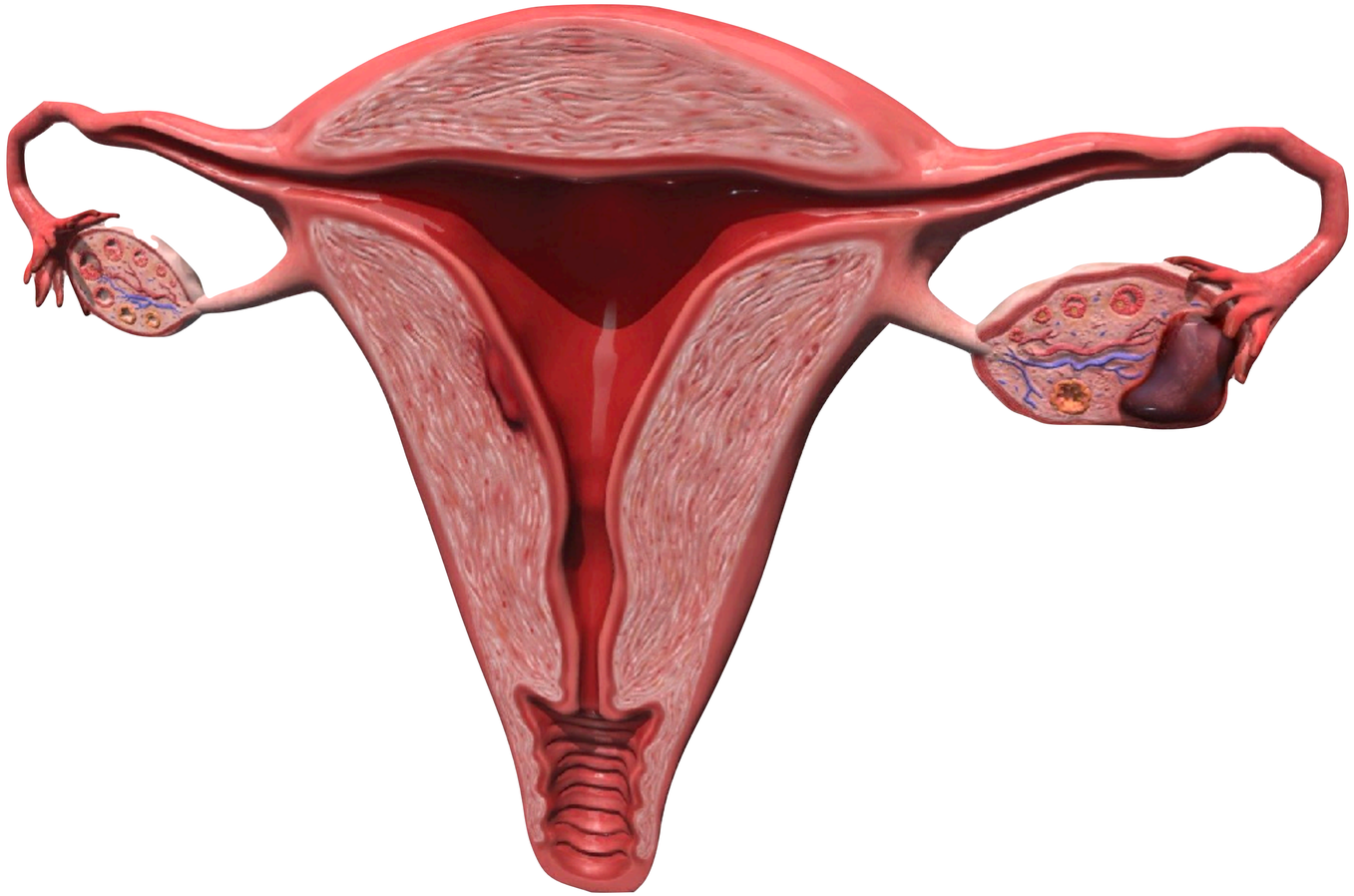


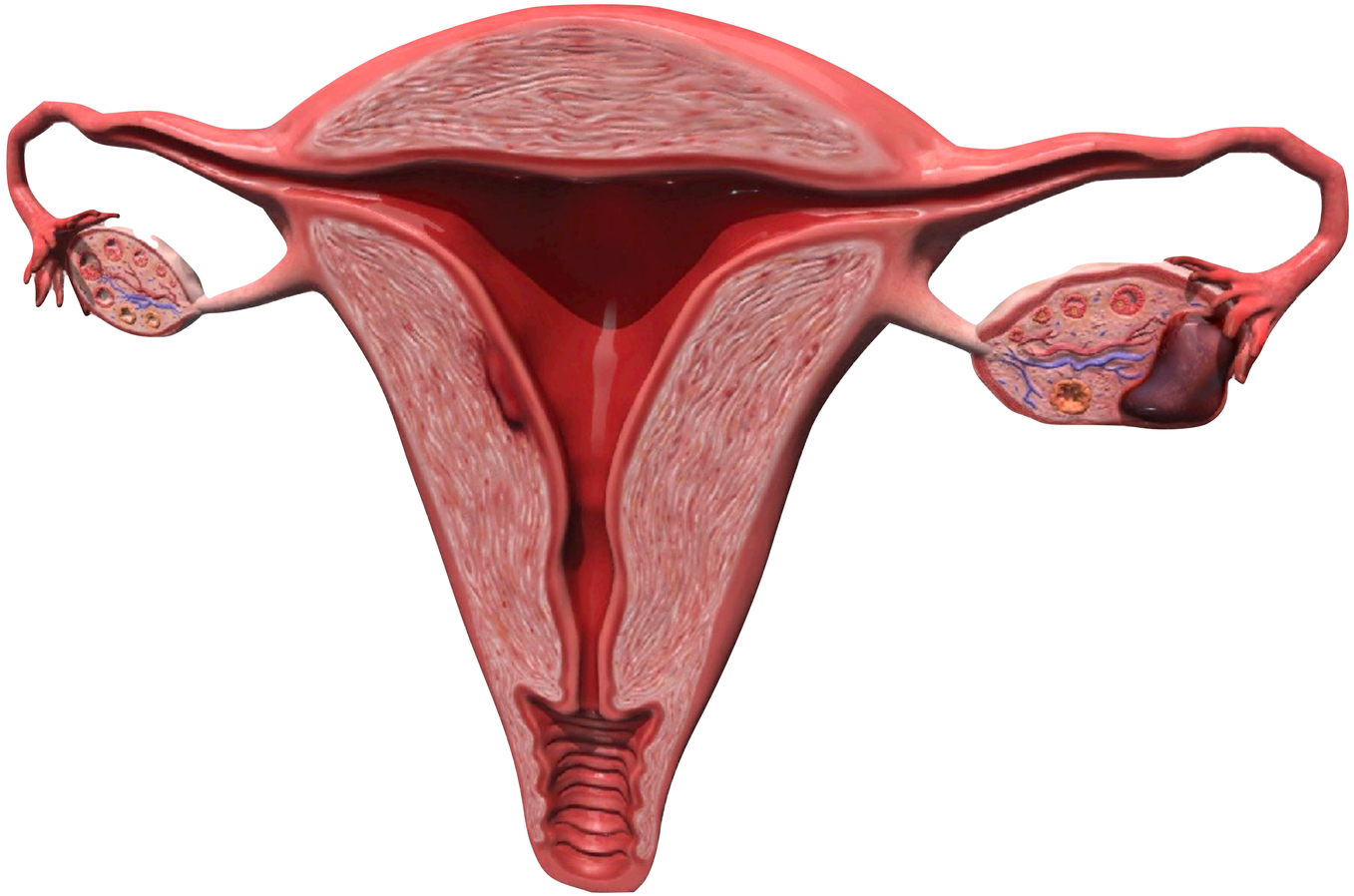
Depends

Depends

AHA 2017

Routine and comprehensive laboratory testing is **not useful** in the evaluation of patients with syncope



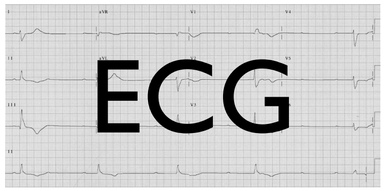


HCG


FreeStyle
Precision Pro
scan
Clear
Menu
Enter
On/Off
Abbott

POC glucose

Syncope

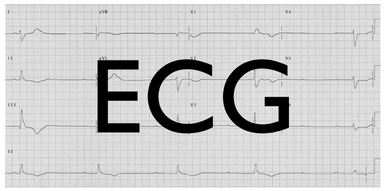


ECG

HCG

glucose

Syncope



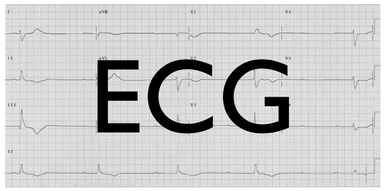
ECG

HCG

glucose

Integrate with H&P

Syncope



ECG

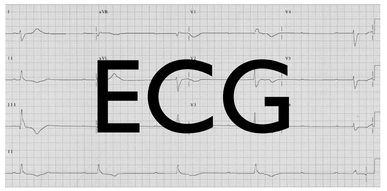
HCG

glucose

Integrate with H&P

syncope

Syncope



ECG

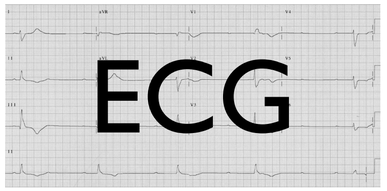
HCG

glucose

Integrate with H&P

syncope

Syncope



ECG

HCG

glucose

Integrate with H&P

syncope

anemia
cardiac ischemia / risk factors

risk stratification

who goes and who stays?

risk stratification

AHA 2017

Hospital evaluation and treatment are recommended for patients presenting with syncope who **have a serious medical condition potentially relevant to the cause of syncope** identified during initial evaluation.

risk stratification

AHA 2017

Hospital evaluation and treatment are recommended for patients presenting with syncope who **have a serious medical condition potentially relevant to the cause of syncope** identified during initial evaluation.

LLS Score

Objectifies clinical gestalt

When to Use | Pearls/Pitfalls | Why Use

MD+CALC

Search “QT interval” or “QT” or “ECG”

We've updated our Privacy Policy and Terms of Use.

LLS Score

Objectifies clinical gestalt

When to Use | Pearls/Pitfalls | Why Use

Does the patient look like shit?

No 0 | Yes +1

MD+CALC

Search “QT interval” or “QT” or “ECG”

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LLS Score

Objectifies clinical gestalt

When to Use | Pearls/Pitfalls | Why Use

Does the patient look like shit?

No 0 | Yes +1

1.0 points

A score >0 indicates high risk for badness

Canadian syncope risk score

Canadian syncope risk score

Predisposition to vasovagal symptoms Triggered by being in a warm crowded place, prolonged standing, fear, emotion, or pain	**No** 0	Yes -1
Heart disease history CAD, atrial fibrillation or flutter, CHF, valvular disease	**No** 0	Yes +1
sBP <90 or >180 mmHg On any reading	**No** 0	Yes +2
Elevated troponin >99th percentile of normal population	**No** 0	Yes +2
Abnormal QRS axis <-30° or >100°	**No** 0	Yes +1
QRS duration >130 ms	**No** 0	Yes +1
Corrected QT interval >480 ms	**No** 0	Yes +2

ED diagnosis
Based on ED evaluation

Vasovagal syncope	**-2**
Cardiac syncope	+2
Neither	0

-2 points
Canadian Syncope Risk Score

Very low risk
0.7% risk of 30-day serious adverse event (death, arrhythmia, MI — full list in Evidence)

Canadian syncope risk score

Anchors heavily on gestalt

Predisposition to vasovagal symptoms Triggered by being in a warm crowded place, prolonged standing, fear, emotion, or pain	No 0	Yes -1
Heart disease history CAD, atrial fibrillation or flutter, CHF, valvular disease	No 0	Yes +1
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Abnormal QRS axis <-30° or >100°	No 0	Yes +1
QRS duration >130 ms	No 0	Yes +1
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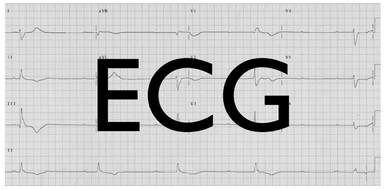
ED diagnosis Based on ED evaluation		
	Vasovagal syncope	-2
	Cardiac syncope	+2
	Neither	0

-2 points Canadian Syncope Risk Score	**Very low** risk 0.7% risk of 30-day serious adverse event (death, arrhythmia, MI — full list in Evidence)

H&P

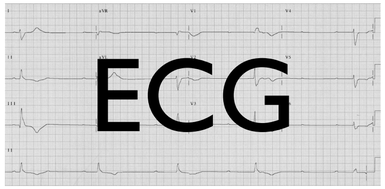


ECG

HCG

syncope

H&P

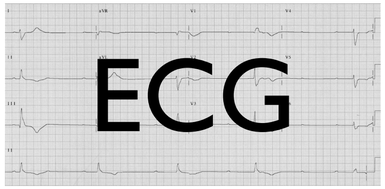


ECG

HCG

syncope

H&P



syncope

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Empowering hospitalists.
Transforming patient care.

Syncope

Effective, Efficient, and Economic Evaluations

Carrie Herzke

cherzke1@jhmi.edu

Why talk about syncope?

Common

Lifetime incidence->40%

Accounts for 3% of all emergency room visits

- ~1/3 of patients presenting with syncope are admitted

Accounts for between 1-6% of all hospitalizations

Costly-while rates of hospitalization remain stable use of imaging has increased from 20-45% since 2001

Estimated to account for $6 billion dollars

Cost increased from $5,400 to $7,460-$9,950/admission (unless you find something then $78,000)

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What they do

Table 1 – Patterns of diagnostic testing in the emergency department.[29,33–35]

Test	% Performed	% Abnormal [a]	% Diagnostic [b]
Blood Chemistry	71	–	1
Hematocrit or Hemoglobin	86–100	2–5	–
Chest X-ray	36–52	13	0
Orthostatic Vital Signs	5–14	–	12–26
Carotid Sinus Massage	0.4	–	0
ECG	93–100	28–36	4–8
Telemetry	17–51	5–11	2
Cardiac Enzymes	29–75	7–11	3
Echocardiogram	2–40	5–12	7
Head CT	13	–	4

[a] Criteria varied by study; denominator includes patients who received the test.

[b] Test identified the presumptive reason for syncope; denominator includes patients who received the test.

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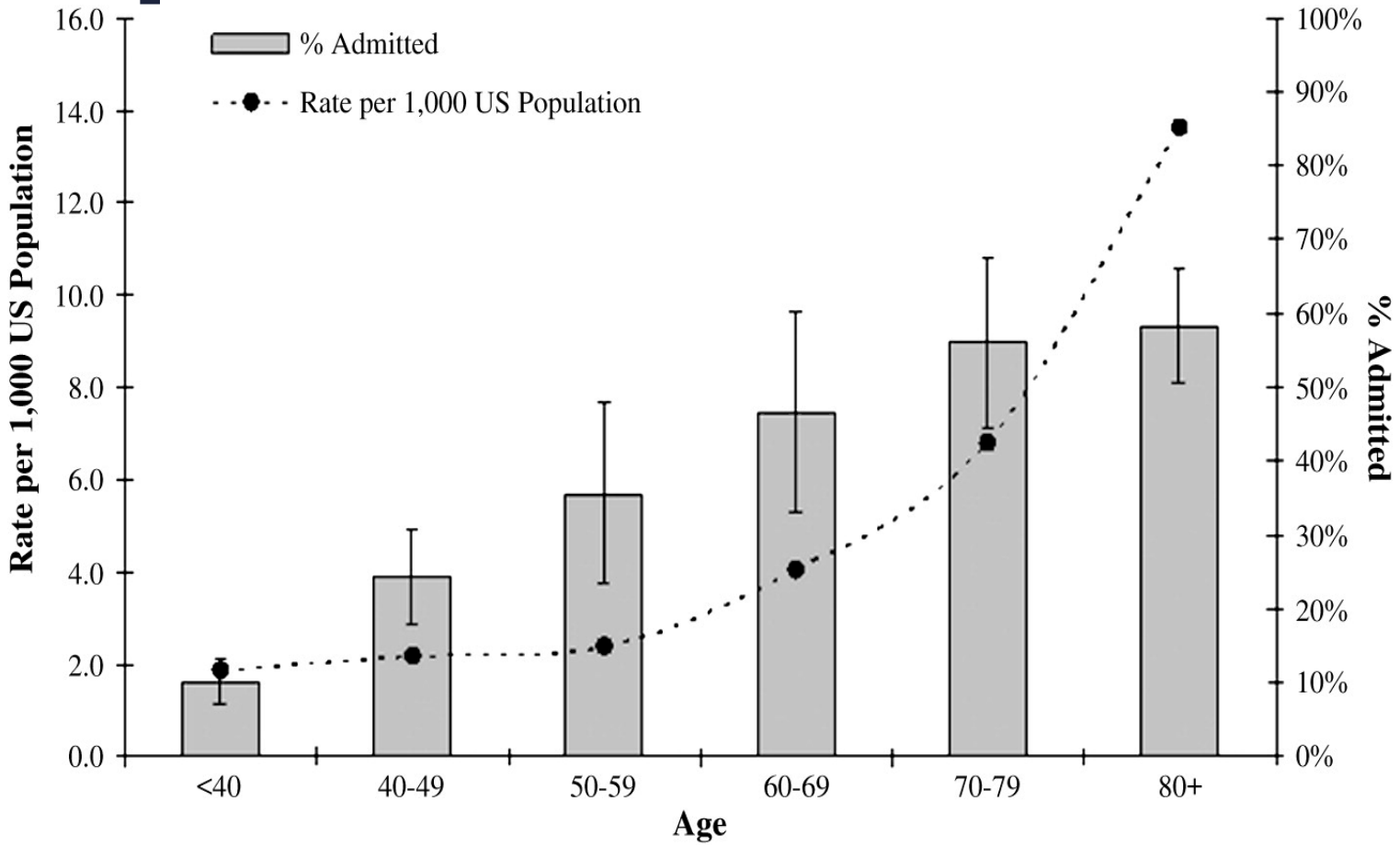
Sun, B. Quality-of-Life, Health Service Use, and Costs Associated With Syncope https://doi.org/10.1016/j.pcad.2012.10.009

What they do-place in a hospital bed on medicine



Sun, B. Quality-of-Life, Health Service Use, and Costs Associated With Syncope
https://doi.org/10.1016/j.pcad.2012.10.009

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But we are no better…

Table 2 – Patterns of inpatient diagnostic testing in admitted patients.[24,28,36,37]

Test	% Performed	% Abnormal [a]	% Diagnostic [b]	% Changed Management [c]
Orthostatic Vital Signs	27–38	28–43	15–30	25
ECG	99	21	3	7
Telemetry	86–100	7–16	1–5	12
Cardiac Enzymes	95	5	0.5	1
Echocardiogram	39–78	5–63	0–2	4
Tilt Test	20	31	24	–
Electrophysiology Study	5	45	16	–
Cardiac Stress Test	6–19	12–41	0–2	9
Cardiac Catheterization	2	50	0	–
Head CT	44–63	4–11	0.5–2	2
Brain MRI	2–7	30	0–2	12
EEG	8–39	6–39	0.6–2	1
Carotid Ultrasound	13–29	7–46	0–0.8	2

[a] Criteria varied by study; denominator includes patients who received the test.
[b] Test identified the presumptive reason for syncope; denominator includes patients who received the test.
[c] Test result changed clinical management per judgment of a physician–reviewer; denominator includes patients who received the test.

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And we haven't been for a while……..

Table 2. Frequency and Results of Various Diagnostic Tests*

Tests	Frequency	Abnormal Results†	Yield‡
Neurologic, No. (%)			
Brain CT scan	283 (44)	31 (11)	5 (2)§
Electroencephalography	253 (39)	44 (17)	6 (2)§
Carotid Doppler	185 (29)	19 (10)	0
Brain MRI	10 (2)	3 (30)	0
Cardiovascular, No. (%)			
Postural BP check	176 (27)	75 (43)	52 (30)
Continuous telemetry	649 (100)	43 (7)	7 (1)
Holter monitoring	193 (30)	30 (16)	6 (3)
Echocardiography	277 (43)	74 (27)	3 (1)
Stress testing	68 (10)	8 (12)	0
Cardiac catheterization	12 (2)	6 (50)	0
Head-up tilt-table test	132 (20)	41 (31)	32 (24)
Electrophysiologic study	31 (5)	14 (45)	5 (16)

**Tests were used in the evaluation of syncope in the 649 patients hospitalized at both hospitals in 1994 and 1998. CT indicates computed tomographic; MRI, magnetic resonance imaging; and BP, blood pressure.*

†Indicates any 1 or more abnormalities among total number of performed tests.

‡Indicates when identified abnormal findings alone explain the cause of syncope, based on the total number of performed tests.

§Among only 34 patients with history and physical examination consistent with acute stroke (n = 20) or seizure (n = 14).

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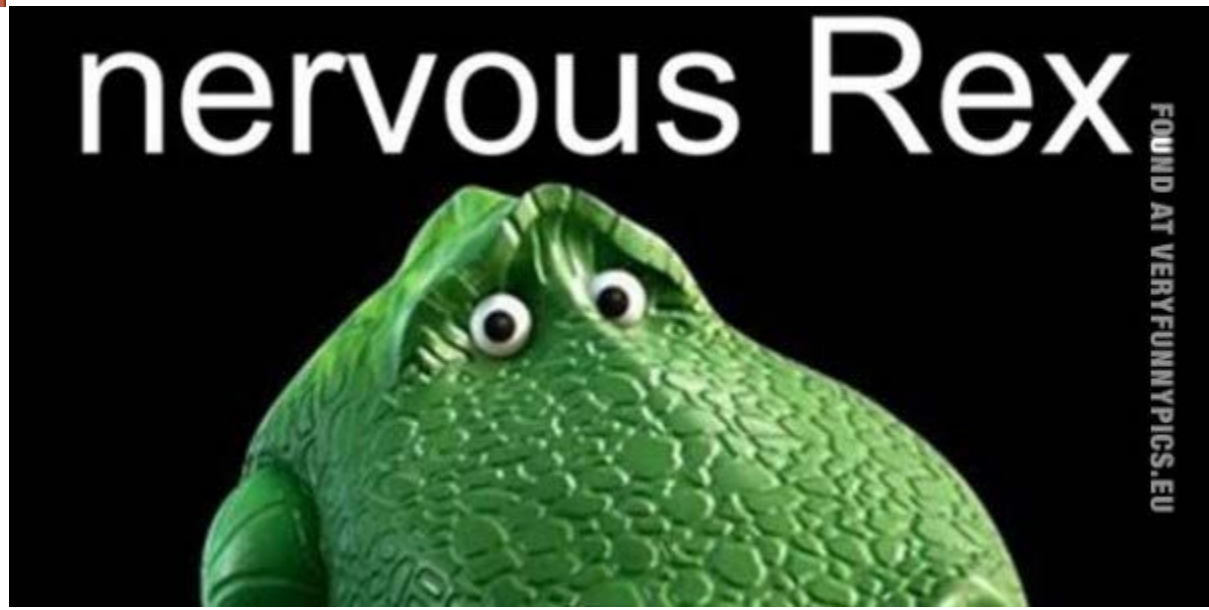
Pires, L et al. Diagnostic Patterns and Temporal Trends in the Evaluation of Adult patients Hospitalized with Syncope Arch Intern Med 2001; 161: 1889-1985

Why do we do so much workup?



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Outcomes of syncope

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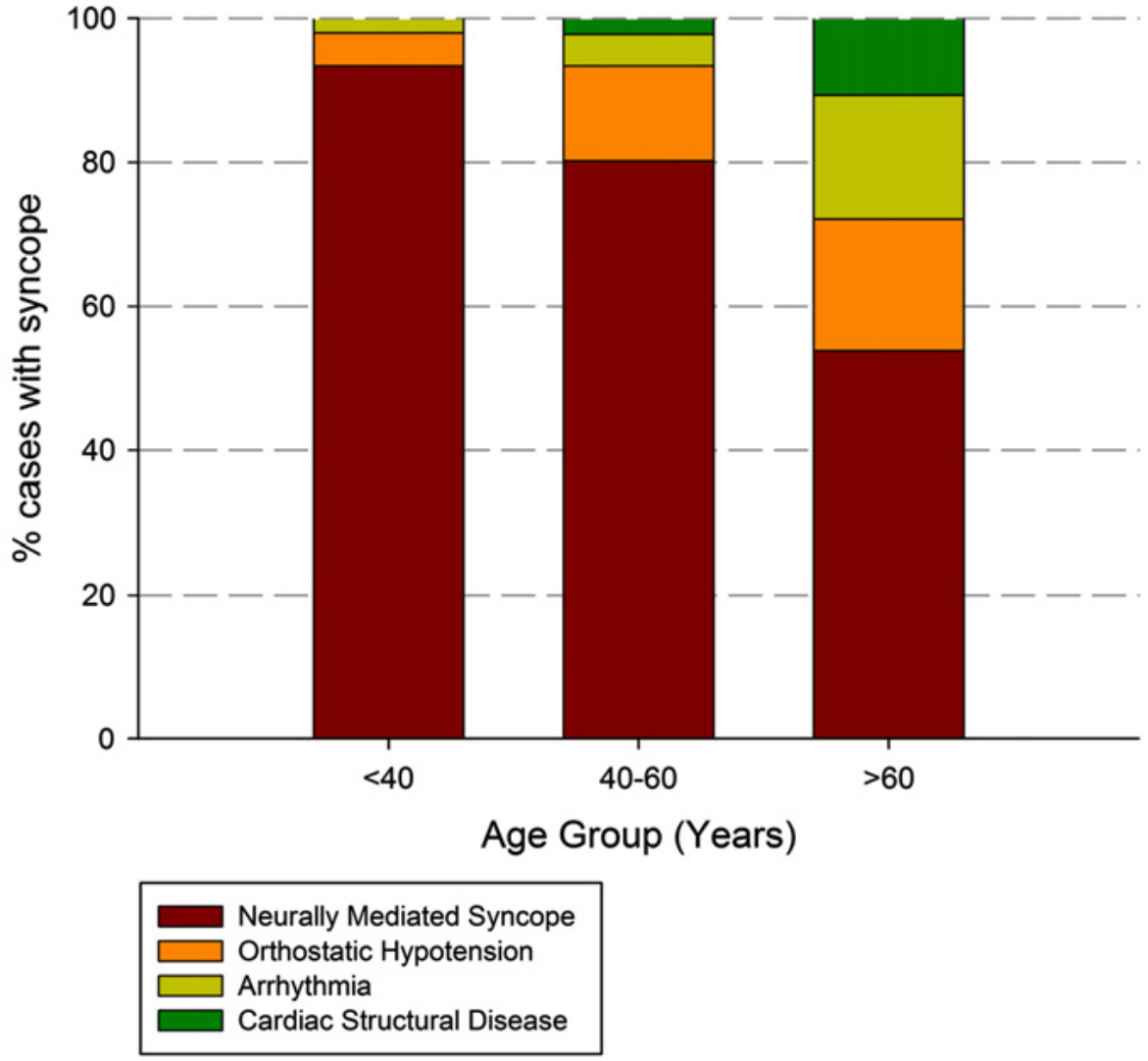
Causes of Syncope by Age



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Marrison, VK et al. The older patient with syncope: practicalities and controversies. 2012: 155: 9-13

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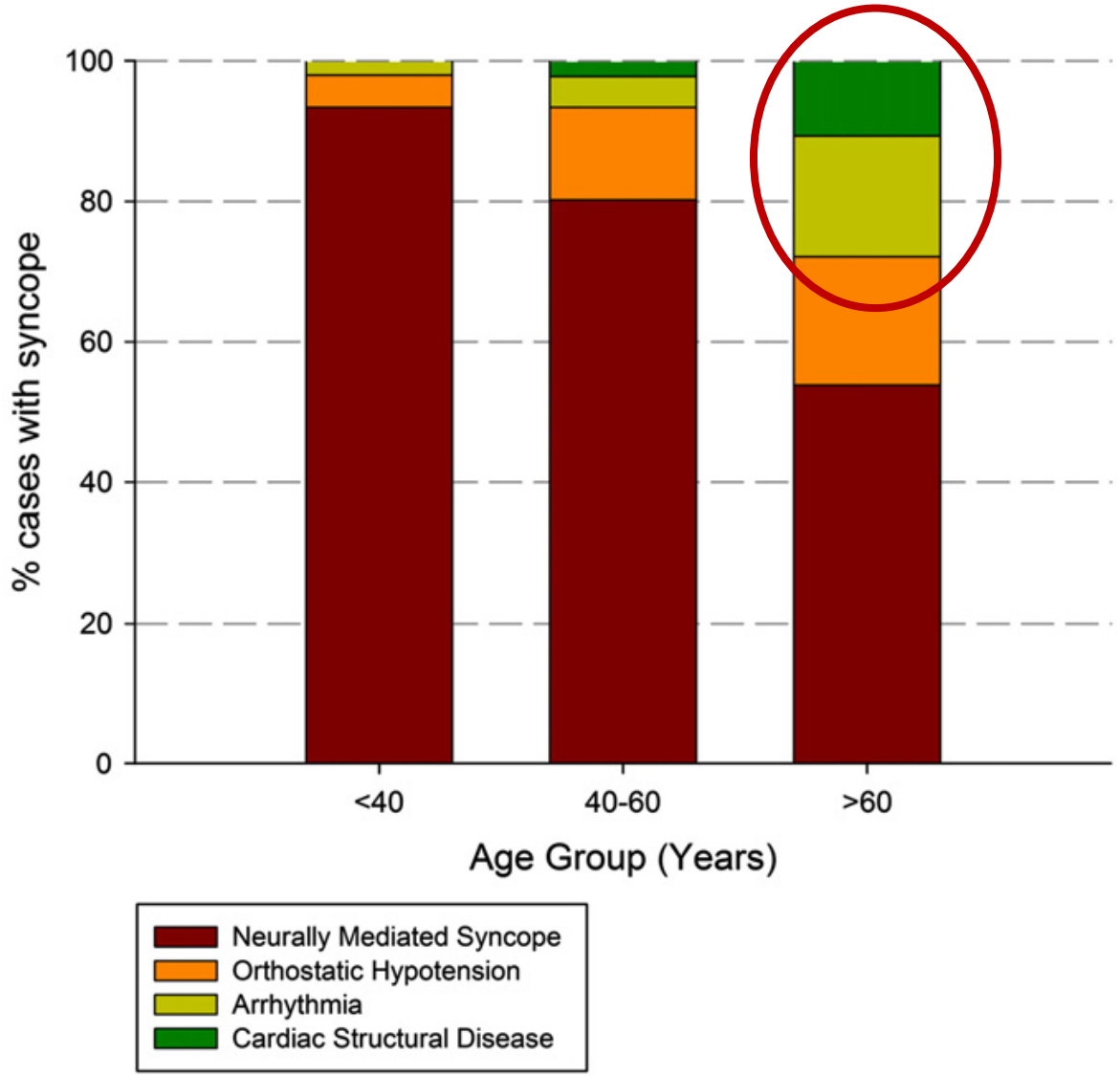

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Marrison, VK et al. The older patient with syncope: practicalities and controversies. 2012: 155: 9-13

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But wait isn't there a guideline (or two)?

ACC/AHA/HRS Guideline for the Evaluation of Syncope and Management of Patients with Syncope

Published in 2017

"The purpose of this guideline is to provide contemporary, accessible, and succinct guidance on the management of adult and pediatric patients with suspected syncope."

ESC Syncope Guidelines 2018

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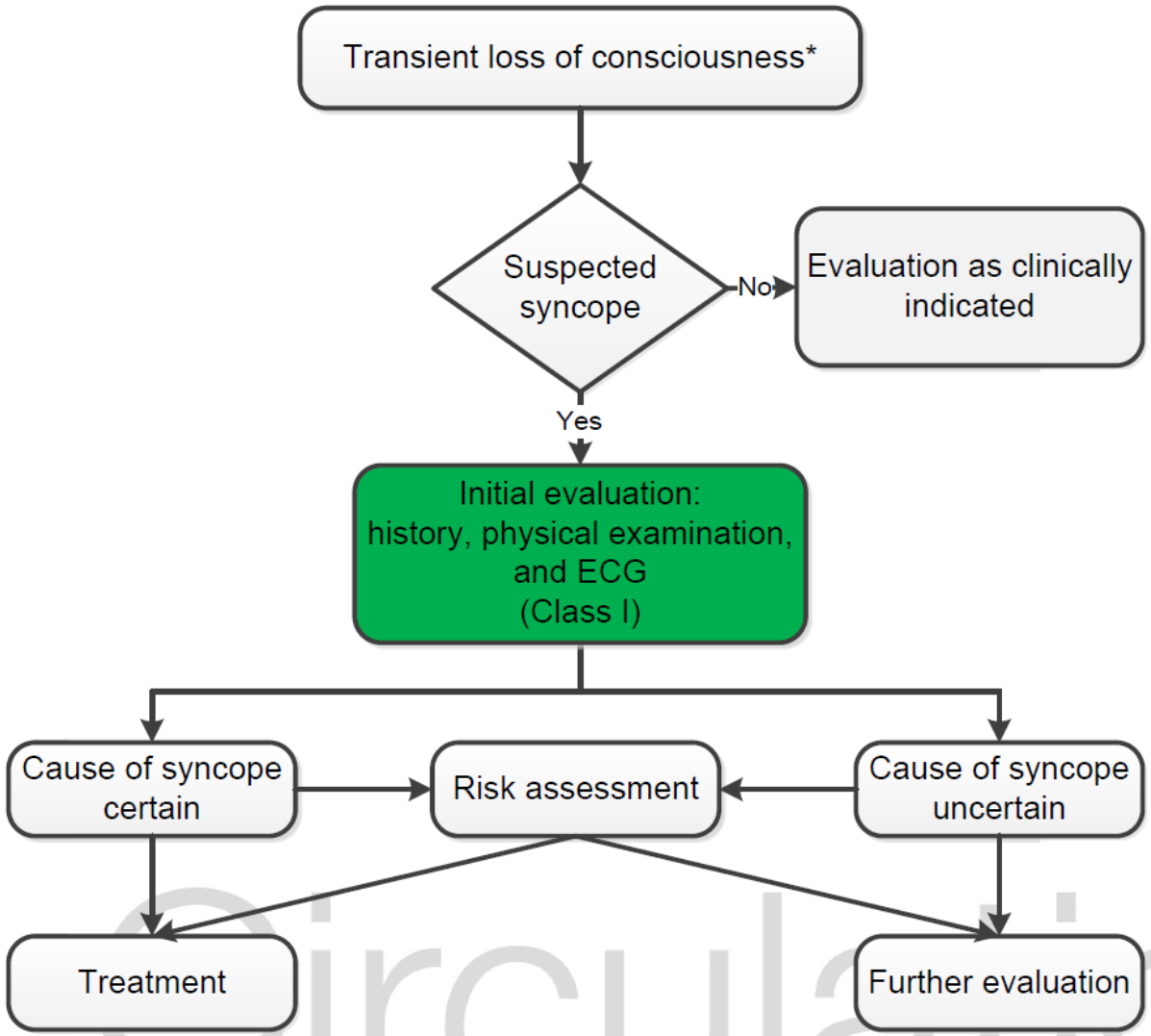
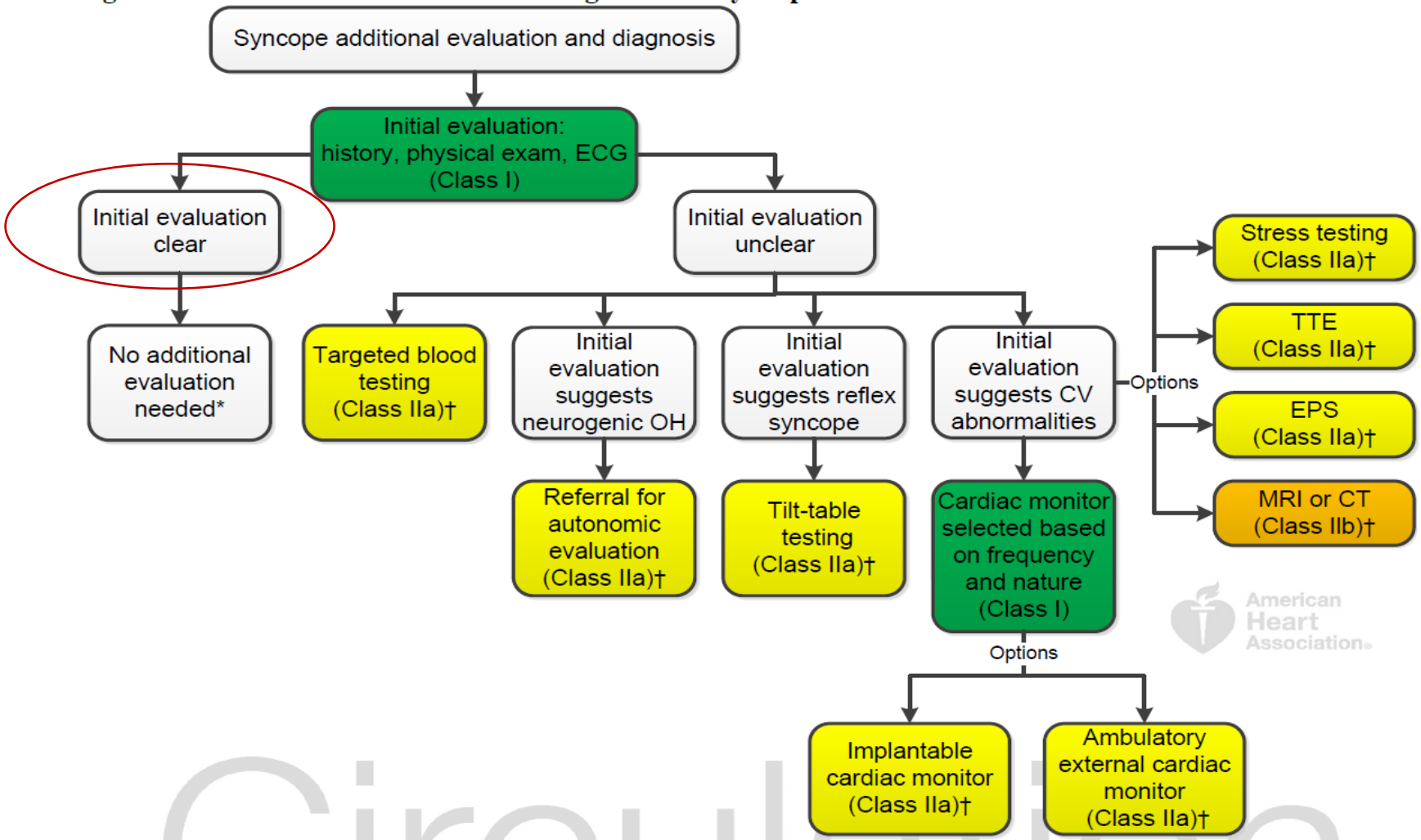
Figure 1. Syncope Initial Evaluation



*See relevant terms and definitions in Table 3.
Colors correspond to Class of Recommendation in Table 1. This figure shows the general principles for initial evaluation of all patients after an episode of syncope.
ECG indicates electrocardiogram.

Figure 3. Additional Evaluation and Diagnosis for Syncope



Colors correspond to Class of Recommendation in Table 1.
*Applies to patients after a normal initial evaluation without significant injury or cardiovascular morbidities; patients followed up by primary care physician as needed.
†In selected patients (see Section 1.4).
CT indicates computed tomography; CV, cardiovascular; ECG, electrocardiogram; EPS, electrophysiological study; MRI, magnetic resonance imaging; OH, orthostatic hypotension; and TTE, transthoracic echocardiography.

So. Problem solved, right?

What they recommend:

H&P

EKG

“Risk Assessment”

- “Although having precise definitions for high-, intermediate-, and low-risk patient groups after an episode of syncope would be useful for managing these patients, evidence from current clinical studies renders this proposal challenging……”

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Well now……

Table 4. Historical Characteristics Associated With Increased Probability of Cardiac and Noncardiac Causes of Syncope (60,67-75)

More Often Associated With Cardiac Causes of Syncope
• Older age (>60 y)
• Male sex
• Presence of known ischemic heart disease, structural heart disease, previous arrhythmias, or reduced ventricular function
• Brief prodrome, such as palpitations, or sudden loss of consciousness without prodrome
• Syncope during exertion
• Syncope in the supine position
• Low number of syncope episodes (1 or 2)
• Abnormal cardiac examination
• Family history of inheritable conditions or premature SCD (<50 y of age)
• Presence of known congenital heart disease
More Often Associated With Noncardiac Causes of Syncope
• Younger age
• No known cardiac disease
• Syncope only in the standing position
• Positional change from supine or sitting to standing
• Presence of prodrome: nausea, vomiting, feeling warmth
• Presence of specific triggers: dehydration, pain, distressful stimulus, medical environment
• Situational triggers: cough, laugh, micturition, defecation, deglutition
• Frequent recurrence and prolonged history of syncope with similar characteristics

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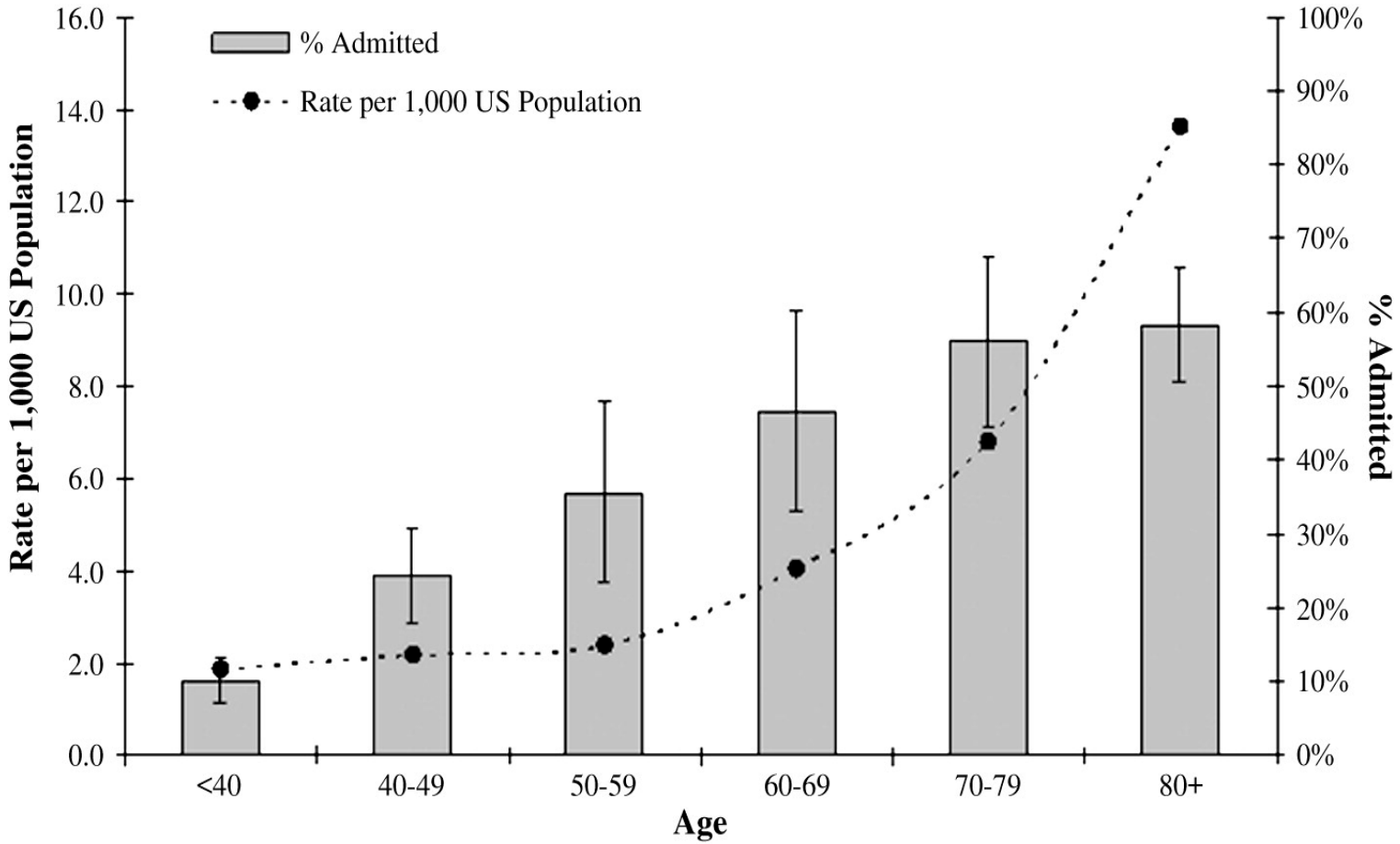

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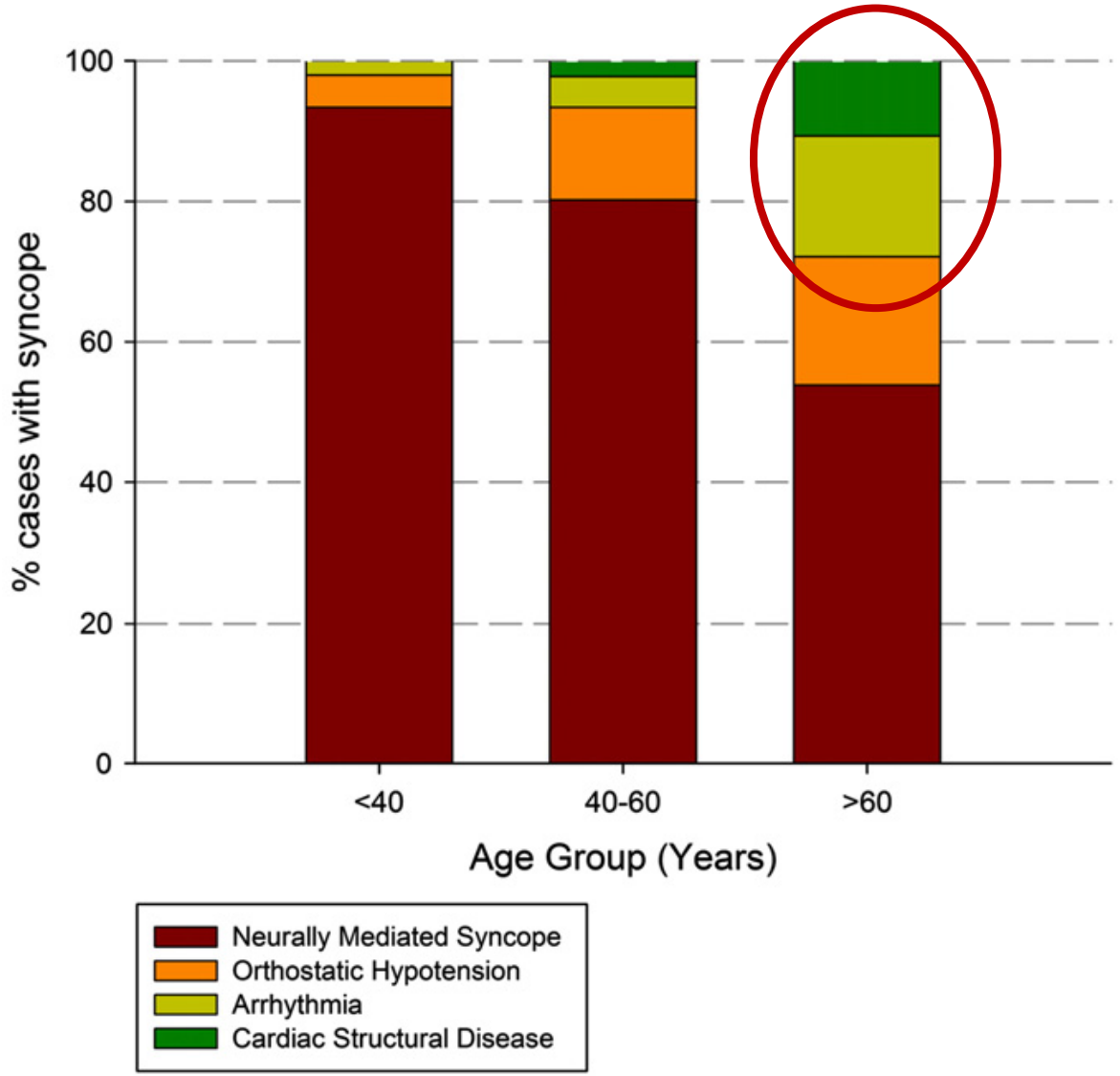
Causes of Syncope by Age



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Marrison, VK et al. The older patient with syncope: practicalities and controversies. 2012: 155: 9-13

Table 5 Clinical features that can suggest a diagnosis on initial evaluation

Reflex syncope

- Long history of recurrent syncope, in particular occurring before the age of 40 years
- After unpleasant sight, sound, smell, or pain
- Prolonged standing
- During meal
- Being in crowded and/or hot places
- Autonomic activation before syncope: pallor, sweating, and/or nausea/vomiting
- With head rotation or pressure on carotid sinus (as in tumours, shaving, tight collars)
- Absence of heart disease

Syncope due to OH

- While or after standing
- Prolonged standing
- Standing after exertion
- Post-prandial hypotension
- Temporal relationship with start or changes of dosage of vasodepressive drugs or diuretics leading to hypotension
- Presence of autonomic neuropathy or parkinsonism

Table 4. Scoring systems for stratifying risk after an episode of syncope

Score	San Francisco Syncope Rule	Rose Risk Score	OESIL Risk Score	EGSYS Syncope Score
Outcome Measures	Risk of serious outcome or death at 1 mo	Risk of serious outcome or death at 1 mo	Risk of all-cause mortality at 12 mo	Death from any cause
Risk Factors	Systolic blood pressure <90 mm Hg Shortness of breath ECG: nonsinus rhythm or new changes present History of congestive heart failure Hematocrit <30%	Brain natriuretic peptide level ≥300 pg per mL (300 ng per L) Bradycardia (≤50 beats per minute) Rectal examination shows fecal occult blood Anemia (hemoglobin level <9.0 per dL [90.0 g per L]) Chest pain associated with syncope ECG with Q wave (not in lead III) Oxygen saturation ≤94% on room air	Age >65 y History of cardiovascular disease Syncope without a prodrome Abnormal ECG findings	Palpitations preceding syncope Heart disease or abnormal EKG or both Syncope during effort Syncope while supine Precipitating or predisposing factors or both (warm-crowded place, prolonged orthostasis, fear, pain, emotion) Autonomic prodrome (nausea/vomiting)
Accuracy	98% sensitive 56% specific	87% sensitive 66% specific	97% sensitive 73% specific	92% sensitive 69% specific

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Angus,S. The Cost Effective Evaluation of Syncope. Med Clin N Am 100 (2016) 1019-1032

Challenges

Risk Prediction Tools look great at a single site, not all preformed well when external validation was attempted

Same patients may score differently on each scale, outcomes measured are different

Designed to be very sensitive-

miss few but pick up many who are fine

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Europeans say NO to risk scores-you should probably say No too

Even if the quality of evidence is moderate, there is strong consensus

from several studies that currently available risk stratification scores have not shown better sensitivity, specificity, or prognostic yield compared with clinical judgment in predicting short-term serious outcomes after syncope. Therefore, they should not be used alone to perform risk stratification in the ED

-2018 ESC syncope guidelines

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BUT WAIT…..

The Canadians may be on to something

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Canadian Syncope Risk Score (CSRS)

Identify adults at risk for serious adverse event w/in 30 days of eval

Death, MI, arrythmia, structural heart disease, aortic dissection, PE, pHTN, hemorrhage, dx requiring intervention

Large prospective cohort and THEN validation cohort

- Total >8000 patients
- 3.6% serious adverse events

Thirguanasambandamoorthy CMAJ 2016; 188: E289-298 and JAMA Intern Med 2020; 180(5): 737-744

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Notes:
BP: from ED triage

Canadian Syncope Risk Score - MDCalc

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Table 6. Multivariable Logistic Regression Model for the 30-Day Primary Composite Outcome With CSRS and OESIL Score Predictors

Predictor	β Coefficient	Odds Ratio (95%CI)
CSRS		
Predisposition to vasovagal syncope	−0.58	0.56 (0.32-0.96)
History of heart disease	0.28	1.33 (0.89-1.97)
Systolic blood pressure reading <90 or > 180 mm Hg	0.11	1.12 (0.55-2.28)
Elevated troponin level (>99th percentile)	0.20	1.22 (0.77-1.92)
Abnormal QRS axis (<−30° or >110°)	0.41	1.48 (0.94-2.39)
QRS duration >130 ms	0.75	2.12 (1.22-3.67)
Corrected QT interval >480 ms	0.15	1.16 (0.69-1.94)
Clinician classification of syncope (ED diagnosis) as vasovagal syncope	−0.82	0.44 (0.23-0.83)
Clinician classification of syncope (ED diagnosis) as cardiac syncope	2.79	16.30 (10.75-24.71)
Intercept	−3.58	
AUC	0.88 (0.85-0.91)	
OESIL		
Age >65 y	1.34	3.85 (2.28-6.50)
History of cardiovascular disease	0.64	1.89 (1.35-2.65)
Syncope without prodrome	0.40	1.49 (1.05-2.12)
Abnormal electrocardiogram	1.10	3.01 (2.06-4.40)
Intercept	−4.65	
AUC	0.76 (0.72-0.79)	

AUC = area under the receiver-operating characteristic curve; CSRS = Canadian Syncope Risk Score; ED = emergency department; OESIL = Osservatorio Epidemiologico della Sincope nel Lazio.

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Zimmerman Annals Intern Med June 2022 https://doi.org/10.7326/M21-2313

Now What?

60% patients triaged as low or very low risk (across US, Europe, Australia)

Clinical “gestalt” likely same outcome as CSRS

BUT

WIDE variety on hospitalization rates for syncope

- As low as 12% in Canada vs up to 80% in some US hospitals
- So maybe in the US this can reduce some hospitalizations?

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Conclusions:

In this study, the CSRS outperformed the OESIL score in predicting serious outcomes after complete ED evaluation for syncope in patients ≥40 years old. Although not an objective measure, physician classification of syncope at ED discharge (vasovagal vs. cardiac vs. other) was as effective as the CSRS and more effective than the OESIL in predicting 30-day serious outcomes after syncope.

Perspective:

Use of the larger nine-component CSRS is likely superfluous given that one component, provider classification of syncope as vasovagal versus cardiac versus other, performed as well as the CSRS in predicting serious clinical outcomes at 30 days. Enthusiasm for multi-component syncope prediction scores will likely cool based on the results of this study.

Perhaps more helpful

What the guideless recommend NOT doing:

Admitting low risk patients

Routine and comprehensive laboratory testing

Routine cardiac imaging…unless cardiac etiology is suspected

Carotid imaging

EEG in absence of specific neurologic features

MRI/head CT without focal neurological findings or head injury

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What about those >65 yo males?

"46% of older patients with heart disease had a neurally mediated cause of syncope and this limits the usefulness of this clinical measure in the differential diagnosis."

Table 4 Predictors of cardiac cause of syncope on multivariable analysis and point scores for the diagnosis of cardiac syncope

Variable	p Value	OR (95% CI)	Regression coefficient	Score
Palpitations preceding syncope	<0.001	64.8 (8.9 to 469.8)	4.2	4
Heart disease or abnormal ECG, or both	<0.001	11.8 (7.7 to 42.3)	2.9	3
Syncope during effort	<0.001	17.0 (4.1 to 72.2)	2.8	3
Syncope while supine	0.007	7.6 (1.7 to 33.0)	2.0	2
Precipitating or predisposing factors, or both*	0.01	0.3 (0.1 to 0.8)	−1.1	−1
Autonomic prodromes†	0.02	0.4 (0.2 to 0.9)	0.8	−1

*Warm-crowded place/prolonged orthostasis/fear–pain–emotion; †nausea/vomiting.

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Del Russo, A et al Clinical Predictors of Cardiac syncope at initial evalution of patients referred urgently to a general hospital: the EGSYS score. Heart 2008

I'll take orthostatic BP for $17

Table 3. Costs of Diagnostic Tests in the Evaluation of Syncopal Episodes[a]

Tests Obtained	Cost Per Test, $[b]	Total Cost, $[c]	Cost per Test Affecting Diagnosis or Management, $[d]
EEG	1115 × 0.34 = 379	65 946 = (379 × 174)	65 946/2 = 32 973
Head CT scan	1545 × 0.34 = 525	696 675 = (525 × 1327)	696 675/28 = 24 881
Cardiac enzymes test	357 × 0.34 = 121	694 298 = (121 × 5738 sets)	694 298/31 = 22 397
Troponin I alone	78 × 0.34 = 26	149 188 = (26 × 5738 sets)	149 188/31 = 4813
Carotid US	1294 × 0.34 = 440	117 480 = (440 × 267)	117 480/6 = 19 580
Head MRI	3316 × 0.34 = 1127	173 558 = (1127 × 154)	173 558/20 = 8678
Cardiac stress test	2492 × 0.34 = 848	109 392 = (848 × 129)	109 392/13 = 8415
Echocardiogram	809 × 0.34 = 275	225 775 = (275 × 821)	225 775/36 = 6272
Electrocardiogram	221 × 0.34 = 75	156 075 = (75 × 2081)	156 075/153 = 1020
Telemetry	255 × 0.34 = 87	174 087 = (87 × 2001)	174 087/245 = 710
Postural BP[e]	5	4040 = (5 × 808)	4040/241 = 17

Abbreviations: BP, blood pressure; CT, computed tomography; EEG, electroencephalogram; MRI, magnetic resonance imaging; US, ultrasonography. aA total of 2106 admissions in 1920 patients.
bCost per test was calculated as the charge per test multiplied by the cost to charge ratio of 0.34, based on the 2007 Yale–New Haven Hospital cost to charge ratio from the State of Connecticut's Annual Report on the Financial Status of Connecticut's Acute Care Hospitals for Fiscal Year 2007.31 cThe total cost is equal to the number of tests obtained multiplied by the cost per test. dCost per test affecting diagnosis or management was calculated as the total cost divided by the number of tests that affected diagnosis or management. An "affected diagnosis" was defined as any test results that were noted in test reports, progress notes, or discharge summary to have contributed to, confirmed, or established any diagnosis; examples included an electrocardiogram identifying atrial fibrillation or postural BP measurements meeting criteria for postural hypotension. An "affected management" was defined as any test results that were noted in test reports, progress notes, or discharge summary to have contributed to any management decision; examples included electrocardiogram resulting in the management of atrial fibrillation with anticoagulation and -blockers or postural BP recordings resulting in the management of orthostatic hypotension with hydration. eA cost of $5 calculated based on 5 minutes of a nurse's time at a $60 per hour wage. Loose criteria for postural BP, as defined in the "Methods" section, were used to calculate costs. If strict criteria, as defined in the "Methods" section, were used, then the cost per test affecting diagnosis or management was $20. Mendu Yield of Diagnostic Tests in Evaluting Syncopal Episodes in Older Patients Arch Intern Med. 2009;169(14):1299-1305. doi:10.1001/archinternmed.2009.204

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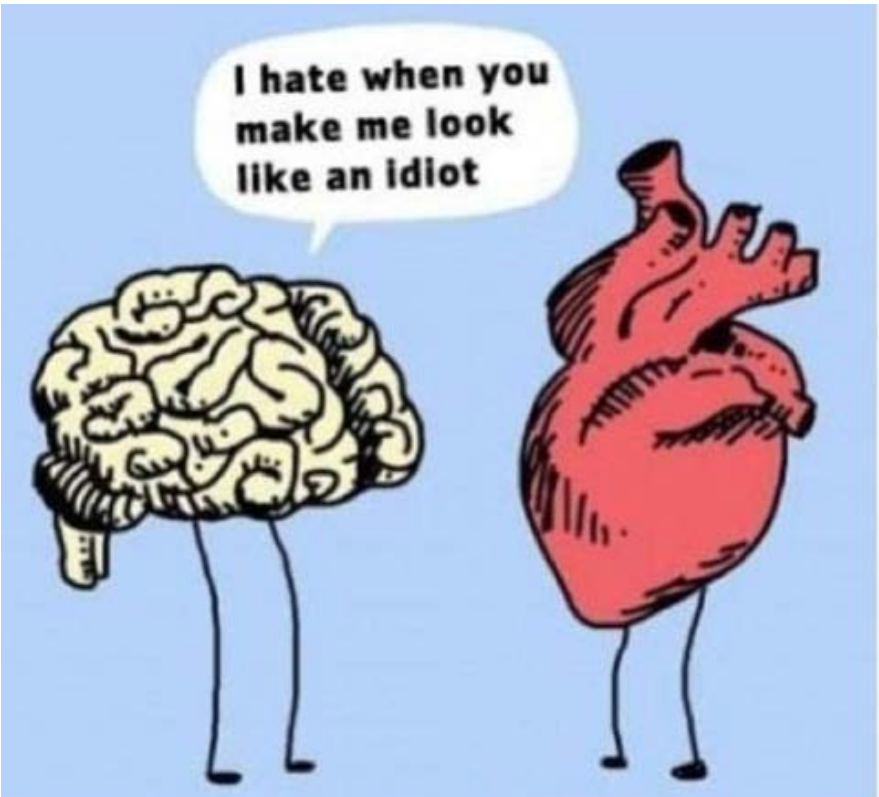
Soooo……

Check orthostatic vital signs on patients with syncope prior to ordering testing beyond an electrocardiogram.



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But how about PE?

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YAJEM-56960; No of Pages 5

American Journal of Emergency Medicine xxx (2017) xxx–xxx

Contents lists available at ScienceDirect

American Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/ajem

Prevalence of pulmonary embolism in patients presenting with syncope. A systematic review and meta-analysis

Zardasht Oqab, MD FRCPC *, Heather Ganshorn, MLIS, Robert Sheldon, MD PhD

Libin Cardiovascular Institute of Alberta, University of Calgary, Calgary, AB, Canada

The pooled estimate of PE prevalence in ED syncope patients was 0.8% (95% CI 0.5–1.3%, I2 = 0%). The pooled estimate of PE prevalence in hospitalized patients was 1.0% (95% CI 0.5–1.9%, I2=0). In contrast, the prevalence of PE in Prandoni et al.were 3.8% and 17.3% for ED and hospitalized patients respectively, both significantly higher than in other relevant studies (p b 0.0001)

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Research

JAMA Internal Medicine | Original Investigation | LESS IS MORE

Prevalence of Pulmonary Embolism in Patients With Syncope

Giorgio Costantino, MD; Martin H. Ruwald, MD, PhD; James Quinn, MD; Carlos A. Camargo Jr, MD, DrPH; Frederik Dalgaard, MD; Gunnar Gislason, MD, PhD; Tadahiro Goto, MD, MPH; Kohei Hasegawa, MD, MPH; Padma Kaul, PhD; Nicola Montano, MD, PhD; Anna-Karin Numé, MD; Antonio Russo, MD; Robert Sheldon, MD, PhD; Monica Solbiati, MD; Benjamin Sun, MD; Giovanni Casazza, PhD

IMPORTANCE Sparse data and conflicting evidence exist on the prevalence of pulmonary embolism (PE) in patients with syncope.

OBJECTIVE To estimate the prevalence of PE among patients presenting to the emergency department (ED) for evaluation of syncope.

DESIGN, SETTING, AND PARTICIPANTS This retrospective, observational study analyzed longitudinal administrative data from 5 databases in 4 different countries (Canada, Denmark, Italy, and the United States). Data from all adult patients (aged ≥18 years) who presented to the ED were screened to identify those with syncope codes at discharge. Data were collected from January 1, 2000, through September 30, 2016.

MAIN OUTCOMES AND MEASURES The prevalence of PE at ED and hospital discharge, identified using codes from the *International Classification of Diseases*, was considered the primary outcome. Two sensitivity analyses considering prevalence of PE at 90 days of follow-up and prevalence of venous thromboembolism were performed.

RESULTS A total of 1 671 944 unselected adults who presented to the ED for syncope were included. The prevalence of PE, according to administrative data, ranged from 0.06% (95% CI, 0.05%-0.06%) to 0.55% (95% CI, 0.50%-0.61%) for all patients and from 0.15% (95% CI, 0.14%-0.16%) to 2.10% (95% CI, 1.84%-2.39%) for hospitalized patients. The prevalence of PE at 90 days of follow-up ranged from 0.14% (95% CI, 0.13%-0.14%) to 0.83% (95% CI, 0.80%-0.86%) for all patients and from 0.35% (95% CI, 0.34%-0.37%) to 2.63% (95% CI, 2.34%-2.95%) for hospitalized patients. Finally, the prevalence of venous thromboembolism at 90 days ranged from 0.30% (95% CI, 0.29%-0.31%) to 1.37% (95% CI, 1.33%-1.41%) for all patients and from 0.75% (95% CI, 0.73%-0.78%) to 3.86% (95% CI, 3.51%-4.24%) for hospitalized patients.

CONCLUSIONS AND RELEVANCE Pulmonary embolism was rarely identified in patients with

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Retrospective, observation study across 4 different countries

Over 1.6 million patients over 16 years

Prevalence of PE: 0.06-0.55%
Admitted patients: 0.15-2.1% for hospitalized patients

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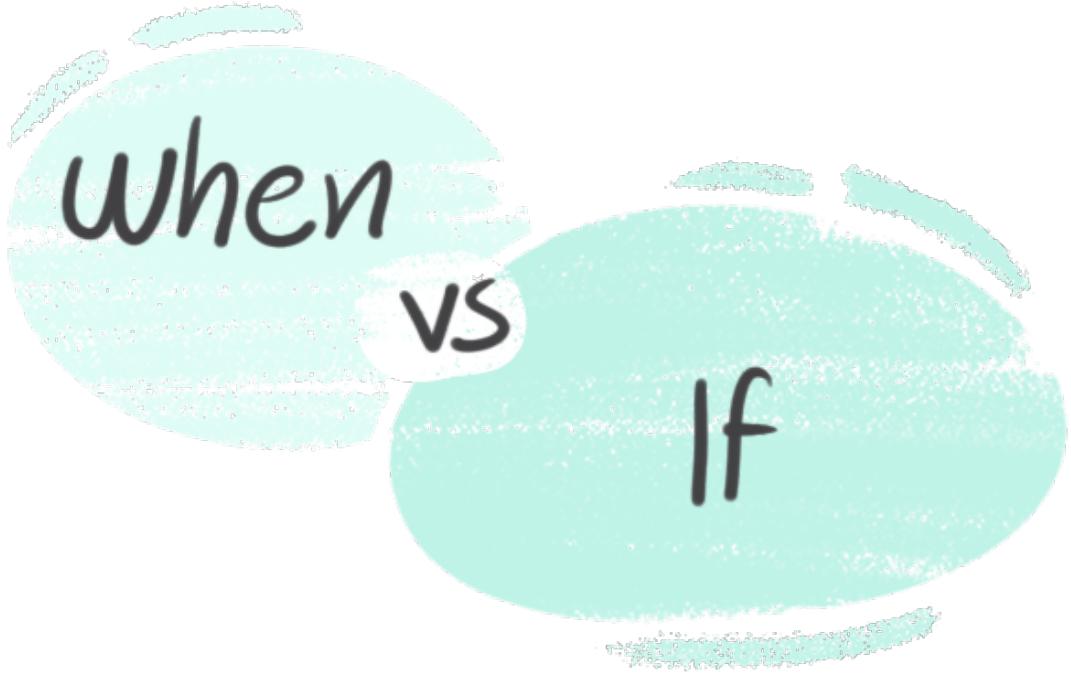
When do you evaluate for PE?



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So when do you work up for PE?

Good story->no etiology despite appropriate evaluation

D dimer

If positive consider imaging

If you have an alternative diagnosis studies do not necessarily support evaluating for PE

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Take away

Take a good history

Take a good history

Start with H&P, EKG, and orthostatic vital signs. If these suggest a benign etiology it is ok to stop working patients up further (even if they are an 80 yo male with CAD)

More tests=more tests but not more diagnosis

DO NOT order carotid dopplers, head imaging, EEGs unless you are convinced there is a neurological etiology for syncope (VERY RARE)

PE is a consideration

References

Angus, S. The Cost Effective Evaluation of Syncope. Med Clin N Am 2016; 100: 1019-1032.

Brignole, M et al. 2018 ESC Guidelines for the diagnosis and management of syncope. European Heart Journal (2018) 39, 1883–1948

Cho, H. et al. Right Care in Hospital Medicine: Co-creation of Ten Opportunities in Overuse and Underuse for Improving Value ni Hospital Medicine. JGIM 2018;

Del Rossa, A. Clinical Predictors of Cardiac Syncope at Initial Evaluation in patients referred urgently to a general hospital: the EGSYS score. Heart 2008; 94: 1620-26.

Mendu, M. et al. Yield of Diagnostic Tests in Evaluating Syncopal Episodes in Older Patients. Arch Intern Med 2009; 1299-1305.

Morrison, VK. etl al. The Older Patient with syncope: practicalities and controversies 2012; 155: 9-13.

Oqab, Z. Prevalence of Pulmonary Embolism in Patients Presenting with Syncope. A systematic review and meta-analysis. Am Journal Emergency Medicine. 2017.

Pires, L. et al. Diagnostic Patterns and Temporal Trends in the Evaluation of Adult Patients Hospitalized with Syncope. Arch Intern Med 2001; 161: 1889-95.

Prandoni, P. Prevalence of Pulmonary Embolism among Patients Hospitalized for Syncope. NEJM 2016; 375: 1524-31.

Sheldon, R. et al. Standardized Approaches to the Investigation of Syncope: Canadian Cardiovascular Society Position Paper. Can J Card 2011; 27: 246-53.

Shen, WK et al. 2017 ACC/AHA/HRS Guideline for the Evaluation and Management of Patients with Syncope. Circulation 2018; 137: 11: 1-164.

Sun, B. Quality-of-Life, Health Service Use, and Costs Associated with Syncope. Progress in Card Dis 2013; 370-75.

Ugar, A. et al. Early and Late Outcome of Treated Patients Referred for Syncope to Emergency Department. Eur Heart J 2010; 31: 2021-26.

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Discussion

Attestation Disclosure to the Audience

The activity director(s), planning committee member(s), speaker(s), author(s) or anyone in a position to control the content for this talk. NO financial interest or relationship which could be perceived as a real or apparent conflict of interest. There were no individuals in a position to control the content that refused to disclose.

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