Cardiology Jeopardy

How Come?	Big Red	Baby Makes Three	Twinkle Toes	Fragrant Twigs
$100	$100	$100	$100	$100
$200	$200	$200	$200	$200
$300	$300	$300	$300	$300
$400	$400	$400	$400	$400
$500	$500	$500	$500	$500

How Come? $100

This is the genetic inheritance pattern of hypertrophic cardiomyopathy.

Hypertrophic Cardiomyopathy (HCM)

What is autosomal dominant?

HOCM (70%) HNCM (30%)

Sarcomeric disease, myocardial fiber disarray

1:500-1000 persons

How Come? $200

Most people with HCM are asymptomatic with normal life expectancy.

These are three symptoms that a patient may have who develops symptoms from HCM.

Hypertrophic Cardiomyopathy

What are the following symptoms:

1. Heart failure
2. Palpitations/arrhythmia
3. Syncope
4. Sudden cardiac death

How Come? $300

These are two provocative maneuvers that can be done on physical examination that will ***increase*** the murmur of HOCM and help to distinguish it from the fixed murmur of aortic stenosis.

Hypertrophic Cardiomyopathy

What is Valsalva maneuver
and Sit to Stand?
(Both maneuvers decrease preload)

How Come? $400

These are ***five*** drugs that are ***contraindicated*** in HOCM because they make the dynamic obstruction WORSE.

Hypertrophic Cardiomyopathy

What are the following:

1. Preload reducers
   a. Diuretics
   b. Venous vasodilators (nitrates)
2. Inotropes (Increased contractility)
   a. Digoxin
   b. Dobutamine
3. Afterload reducers (Improves contractility)
   a. ACEI/ARB
   b. Dihydropyridine calcium channel blockers (amlodipine, nifedipine)
   c. Sodium nitroprusside
   d. Hydralazine
   e. Minoxidil

How Come? $500

These are ***three*** indications for placement of an intracardiac defibrillator for primary prevention of sudden cardiac death in a patient with HCM.

Hypertrophic Cardiomyopathy

Unexplained syncope	A history of unexplained syncope occurring 6 months prior to clinical evaluation is associated with an increased risk of SCD
Maximal left ventricular-wall thickness	There is a linear relationship between left ventricular-wall thickness and SCD. A thickness ≥30 mm is an independent risk factor for SCD, with a 20 % increase in the relative risk of death at 10 years compared to the general HCM population
Nonsustained ventricular tachycardia	In select patients, especially young patients, a history of nonsustained ventricular tachycardia on ambulatory monitoring is a marker for increased risk of SCD. There may be value in longer-term monitoring to assess the burden of nonsustained ventricular tachycardia in unclear cases
Abnormal blood pressure response to exercise	Many patients with HCM have an abnormal blood pressure response to exercise, defined as a decrease in systolic pressure of 20 mmHg or a failure to increase systolic blood pressure by 20 mmHg while exercising. A normal response to exercise has a high negative predictive value. An abnormal response to exercise is useful in conjugation with other risk factors
Family history of SCD	A history of documented SCD in at least one first-degree family member is associated with an increased risk of SCD. There is currently no conclusive evidence that a history of SCD in second-degree and more distantly-related family members should influence the decision to place an implantable cardioverter-defibrillator

Big Red: $100

Abdominal aortic aneurysm is often incidentally found on CT or ultrasound done for another reason. 75% of patients diagnosed are asymptomatic at the time of diagnosis.

This is recommendation for screening for AAA according to the USPSTF.

Abdominal Aortic Aneurysm

USPSTF recommends one-time screening with duplex ultrasound in men aged 65 to 75 years who have smoked at least 100 cigarettes in their lifetime.

AAA = AP diameter > 3.0 cm

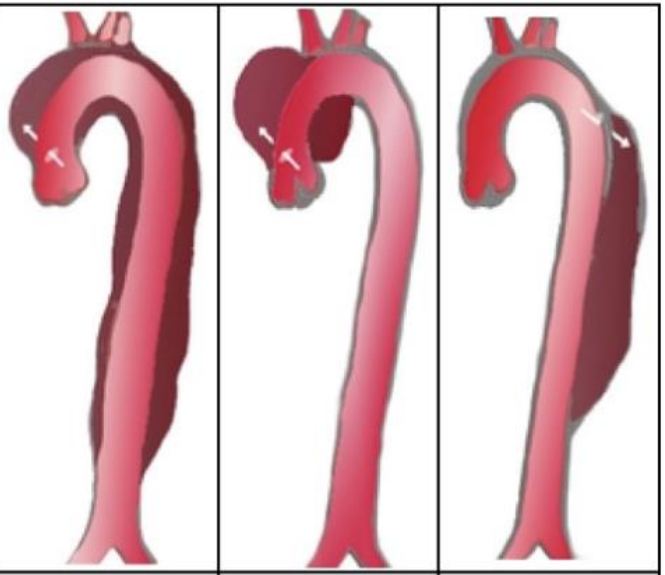
Risk factors= Male sex (6:1), advanced age, smoking, atherosclerosis, hypertension and family history.

Big Red: $200

This is the Stanford classification for aortic dissection.

Aortic Dissection

Classification of aortic dissection



Percentage	60%	10–15%	25–30%
Type	DeBakey I	DeBakey II	DeBakey III
	Stanford A (Proximal)		Stanford B (Distal)

What is type A and type B? (Stanford)

Type A =

Acute surgical emergency

Type B =

Medical management

Big Red: $300

Thoracic aortic aneurysms are defined as an increase in the thoracic aortic diameter of greater than 50% relative to the expected or normal dimension. TAAs occur at the level of the aortic root, ascending aorta, aortic arch or descending aorta.

In addition to atherosclerosis and trauma, these are 3 risk factors for thoracic aortic aneurysm.

Risk Factors for TAA

1. Connective tissue disorders
   a. Marfan syndrome
   b. Ehlers-Danlos syndrome type 4
   c. Loeys-Dietz syndrome
   d. Ankylosing spondylitis

2. Congenital disorders
   a. Bicuspid aortic valve
   b. Coarctation of the aorta
   c. Turner syndrome
   d. Familial TAA and aortic dissection syndrome

3. Vasculitis
   a. Takayasu arteritis
   b. Giant cell arteritis

4. Infectious
   a. Septic embolism
   b. Syphilis

5. Atherosclerosis
6. Trauma

Big Red: $400

Aortic dissection is a potentially life-threatening emergency.

These are the three of the most common clinical presentations of aortic dissection that should prompt urgent evaluation.

Clinical Presentation of Aortic Dissection

What is:

1. Severe pain of chest/abdomen/flanks "ripping or tearing" quality
   (>90% type A, 75% type B)
2. Hypertension (80-90%) >> shock*
   (*16% with type A, 2.9% type B)
3. Neurologic deficit (9.5%)
4. Heart failure (7.6%)
5. Syncope (6.7%)

Journal of International Medical Research 2017, Vol. 45(2) 823–829, L. Zhao, et al. 2017

Big Red: $500

In addition to pain control,this is the appropriate medical treatment for a patient with aortic dissection including the goal blood pressure and heart rate.

Medical Treatment of Aortic Dissection

What is an IV b-blocker (labetolol, propranolol, or esmolol) to decrease heart rate to 60-70 and systolic blood pressure <120 mm Hg first, ***then add*** arterial vasodilator to get MAP 60-75.

Research Reports in Clinical Cardiology; Diagnosis and clinical management of aortic dissection; Phillips B Harrington, et al Melby Division of Cardiothoracic Surgery, Department of Surgery, University of Alabama at Birmingham, Birmingham, AL, USA, 19 June 2014

Baby Makes Three: $100

These are the ***normal*** physiologic hemodynamic changes in pregnancy. (CO, SVR, HR, BP)

Normal Cardiovascular Physiology in Pregnancy

What is Increase in CO and HR and Decrease in SVR and BP?

Table. Interrelationships of Changes in the Major Variables That Contribute to the Cardiovascular Changes in Pregnancy Compared With Preconception Values

Preconception		Pregnancy			Labor
Baseline		**First Trimester**	**Second Trimester**	**Third Trimester**	
Hemodynamic	CO	↑	↑↑	↑↑	↑↑↑↑
	SVR	↓	↓↓	↓↓	
	HR	↑	↑↑	↑↑↑	↑↑↑↑
	BP	↓	↓	↔	(Pain)

https://doi.org/10.1161/CIRCULATIONAHA.114.009029

Baby Makes Three: $200

According to the CDC, this is the percentage of cases of maternal mortality attributed to cardiovascular causes in the US.

Maternal Mortality in the United States

What is 33%?

The most recent CDC report on maternal mortality from May 2019 also identified cardiovascular conditions (including cardiomyopathy, myocardial infarction, and cerebrovascular accidents) as the cause for more than 33% of pregnancy-related deaths.

From 2003 to 2012 there was a 25% increase in the number of women entering pregnancy with preexisting heart disease. Most of these women have congenital heart disease or valvular heart disease.

Collier AY, Molina RL. Maternal Mortality in the United States: Updates on Trends, Causes, and Solutions. Neoreviews. 2019 Oct;20(10):e561-e574. doi: 10.1542/neo.20-10-e561. PMID: 31575778; PMCID: PMC7377107.

Baby Makes Three: $300

Women with *this* type of cardiac valvular lesion typically develop symptoms in pregnancy but women with *this* type of cardiac valvular lesion typically does well in pregnancy.

Valvular Disease in Pregnancy

What is women with **obstructive** valvular diseases develop symptoms in pregnancy and women with **regurgitant** valvular diseases do well in pregnancy?

Baby Makes Three: $400

This is the American College of Cardiology recommendation for the management of anticoagulation in pregnancy in a women who has a mechanical heart valve prosthesis.

Management of Anticoagulation in Pregnancy

What is warfarin during the first trimester if the daily dose is ≤ 5 mg or less at the time of conception and dose-adjusted LMWH if the dose is > 5 mg daily.

Second and early third trimester: warfarin okay

Late third trimester: LMWH

Labor/Delivery: IV heparin

Baby Makes Three: $500

These are 3 maternal cardiac contraindications to pregnancy.

Maternal cardiac contraindications to pregnancy

TABLE II. Contraindications for Pregnancy

Marfan syndrome with dilated aortic root (>4 cm)
Pulmonary hypertension (pulmonary vascular resistance, >6 Wood units)
Moderate-to-severe left ventricular outflow tract obstruction (≥30 mmHg)
Left ventricular ejection fraction <0.30

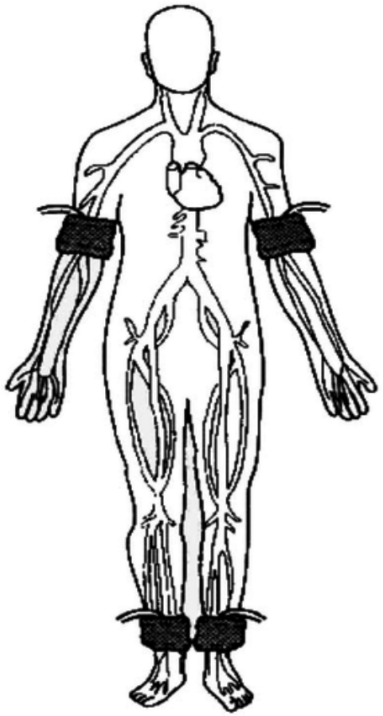
Franklin WJ, Benton MK, Parekh DR. Cardiac disease in pregnancy. Tex Heart Inst J. 2011;38(2):151-3. PMID: 21494524; PMCID: PMC3066821.

Twinkle Toes- $100

According to the guidelines from the American Heart Association and the American College of Cardiology, ***this test*** can be used to screen for PAD in an ***asymptomatic person*** who is at increased risk.

Diagnosis of PAD

What is an ankle-brachial index (ABI)?



How to perform ankle/brachial index.

Right ABI:

$$\frac{\text{Higher of the right ankle systolic pressures (posterior tibial or dorsalis pedis)}}{\text{Higher arm systolic pressures (left or right arm)}}$$

Left ABI:

$$\frac{\text{Higher of the left ankle systolic pressures (posterior tibial or dorsalis pedis)}}{\text{Higher arm systolic pressures (left or right arm)}}$$

Twinkle Toes- $200

This is the value range that is considered normal for an ankle brachial index test.

Ankle Brachial Index Test

What is 1.0-1.4?

ABI Value	Interpretation	Recommendation
Greater than 1.4	Calcification / Vessel Hardening	Refer to vascular specialist
1.0 - 1.4	Normal	None
0.9 - 1.0	Acceptable	
0.8 - 0.9	Some Arterial Disease	Treat risk factors
0.5 - 0.8	Moderate Arterial Disease	Refer to vascular specialist
Less then 0.5	Severe Arterial Disease	Refer to vascular specialist

Twinkle Toes- $300

Your 50-year-old male patient has symptoms of intermittent claudication in his left calf that starts after walking for about a block and improves with rest. He is a smoker and hypercholesterolemic.

You order an ABI test that returns as normal (1.1)

This is the test your order next to evaluate for PAD.

Symptoms of PAD in high-risk individual with normal ABI

What is exercise ABI testing?

Useful with ABI values 0.91-1.4 with high pre-test probability of PAD.

A post-exercise ankle pressure drop of $\geq 30\ mm\ Hg$ or more suggests PAD.

Twinkle Toes- $400

Your 50-year-old male patient has symptoms of intermittent claudication in his left calf that starts after walking for about a block and improves with rest. He is a smoker and hypercholesterolemic.

You order an ABI test that returns with a value of 1.41.

This is the test your order next to evaluate for PAD.

Elevated ABI in a patient at high-risk for PAD

What is a toe-brachial index?

An ABI ≥ 1.4 indicates a non-compressible artery in the lower extremities and is non-diagnostic of PAD.

A toe-brachial index is indicated to diagnose PAD in these patients.

(< 0.6 indicates disease)

Twinkle Toes- $500

The drug, cilostazol, has been shown to improve pain-free walking distance and overall walking distance in patients with claudication. Clinical practice guidelines recommend a trial of cilostazol be considered in patients with claudication.

This is the mechanism of action of cilostazol and ***this*** is the black box warning.

Cilostazol

What is inhibition of phosphodiesterase III; such activity has been shown to decrease survival of patients with class III-IV CHF; contraindicated in patients with CHF of any severity?

Fragrant Twigs $100

You admit an 80-year-old woman from the ED who had a mechanical fall when she got tangled in her dog's leash and broke her left hip. They have asked you to "clear" the patient for surgery.

What do you call this surgical repair in terms of timing?

Surgical Urgency in Perioperative Risk Assessment

What is ***urgent*** with plan to take her to the OR within 24 hours for repair?

Emergent: < 6 hours
Urgent: 6-24 hours
Time-sensitive: 1-6 weeks
Elective: 1 year

Fragrant Twigs $200

According to the 2022 AHA/ACC Guidelines, THIS the ejection fraction of HFrEF, THIS is the ejection fraction of HFpEF, and THIS is HFmrEF. (the numbers and what it stands for)

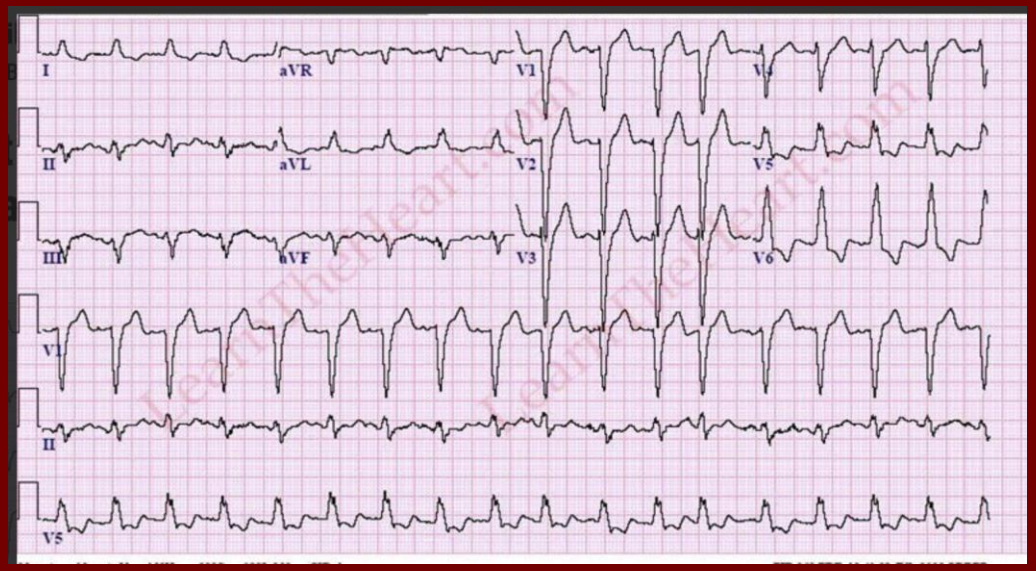
Heart Failure Classification

What is:

- HFrEF $\leq$ 40% EF
- HFpEF $\geq$ 50% EF
- HFmr (mildly reduced) EF 41-49% EF?

Fragrant Twigs $300

Your patient with class C heart failure (EF 25%) is on goal directed medical therapy and is still symptomatic with mild exertion. His ECG is shown.



THIS is the next treatment option available to improve his symptoms and mortality from HF.

Indication for Cardiac Resynchronization in HFrEF

What is a biventricular pacemaker for cardiac resynchronization?

The ACC/AHA/HRS guidelines for CRT[4, 5]

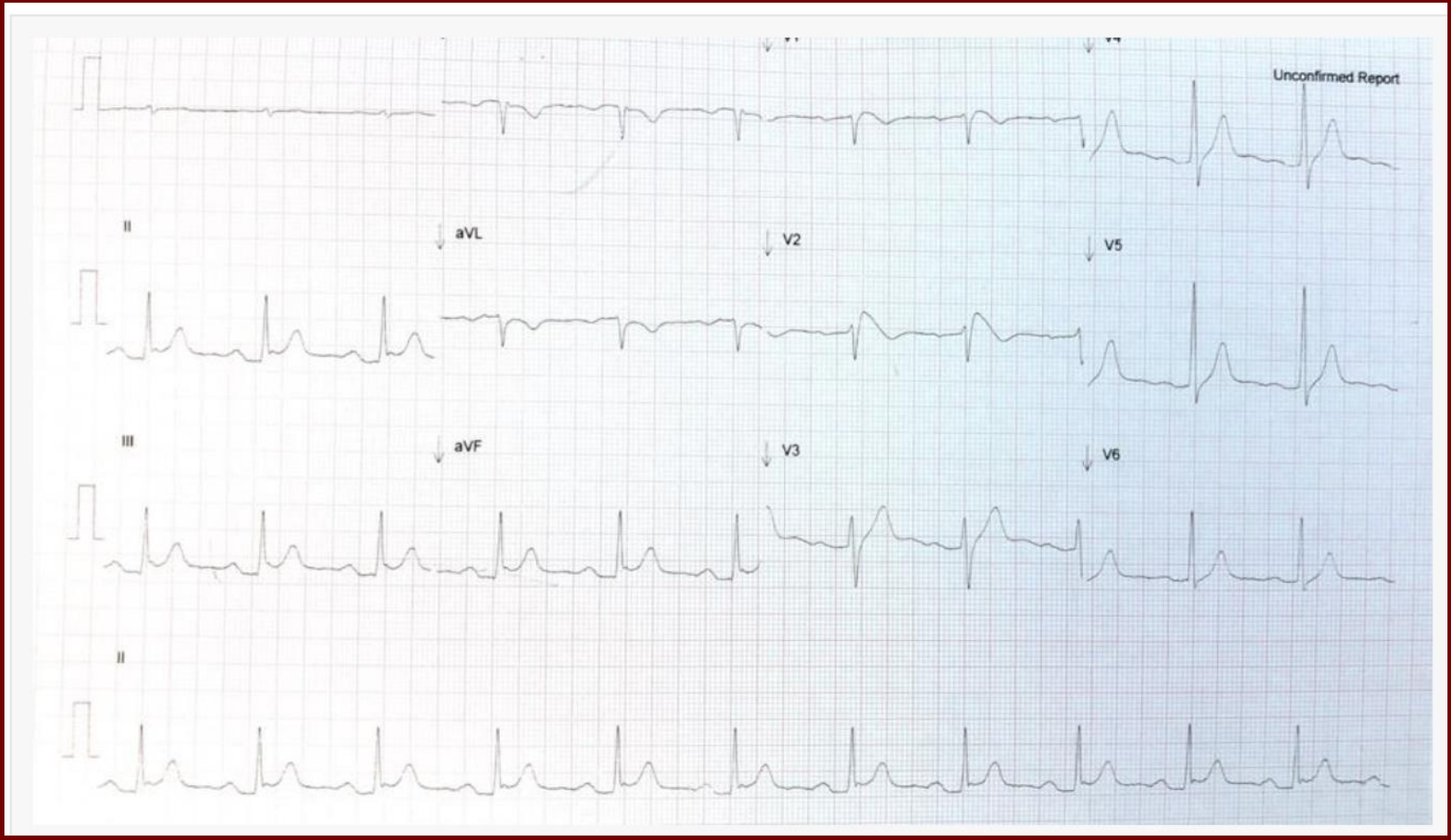
Class I ("Indicated")

CRT is indicated for the following:

- (With or without an implantable cardioverter-defibrillator [ICD]) Patients with sinus rhythm, an LVEF of 35% or less, a QRSd of 120 ms or longer, and an NYHA functional class III or ambulatory IV HF symptoms despite optimal medical therapy [4]
- Patients with sinus rhythm, an LVEF of 35% or less, LBBB with a QRSd of at least 150 ms, and NYHA class II, III, or ambulatory IV symptoms despite optimal medical therapy [5]

Fragrant Twigs $400

A 24-year-old man of Asian ancestry presents to the ED with syncope. His ECG is below. This is the likely cause of his syncope.



Brugada Syndrome

What is Brugada syndrome?

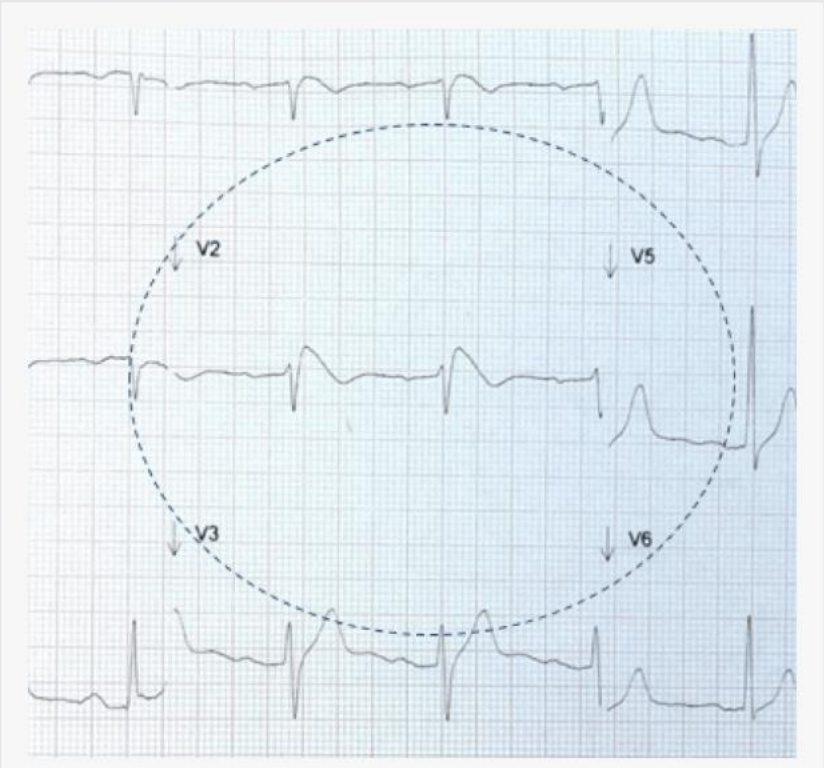
It is an inherited autosomal dominant Na+ channel abnormality. It is far more common in males (by factor of 8-10:1) where it is the second most common cause of death in those less than 40 years of age.

The true prevalence is difficult to estimate, as it is a dynamic ECG pattern, ie., it is not always present. It is usually associated with sudden death in those with structurally normal hearts.

Its prevalence is about 5/10000 of the population, being responsible for approximately 4% of all sudden cardiac deaths.

It has a high prevalence in South-East Asia and is the same disorder as the previously known Sudden Unexplained Nocturnal Death Syndrome(SUNDS)(2)

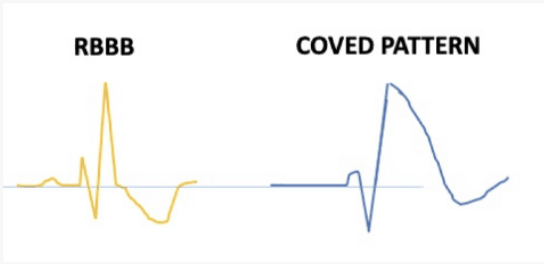
Brugada syndrome



The important elements of the pattern are:

It has a concave or rectilinear pattern in V1 or V2

There is an upslope of usually greater than 2mm at the end of the QRS



RBBB vs Coved pattern

Unlike right bundle branch

Fragrant Twigs $500

A 60-year-old man of African ancestry presents to the hospital with symptoms of new onset heart failure. He is a regular cocaine user. His echocardiogram shows increased wall thickness of the LV. ECG reveals low voltage. A coronary angiogram reveals non-obstructive coronary disease.

THIS is the likely diagnosis.

Hereditary ATTR Amyloidosis

What is hereditary ATTR amyloidosis?

- Genetic mutation in TTR gene.
- Occurs in 3.4% of black persons living in the US

- Think of diagnosis with increased LV thickness and low voltage ECG.
- Abnormal cardiac MR and diagnostic 99m-technetium pyrophosphate scintigraphy of heart
- Tafamidis, protein stabilizer, reduces mortality