Ashur University
College of Medicine

Grade 1

Cardiovascular Module
Cardiovascular Physiology
Lec.11

Syncope
(Fainting.. Collapse.. Fall down)



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Objectives:

1. Understand the Definition of Syncope.

2. List the types of syncope.

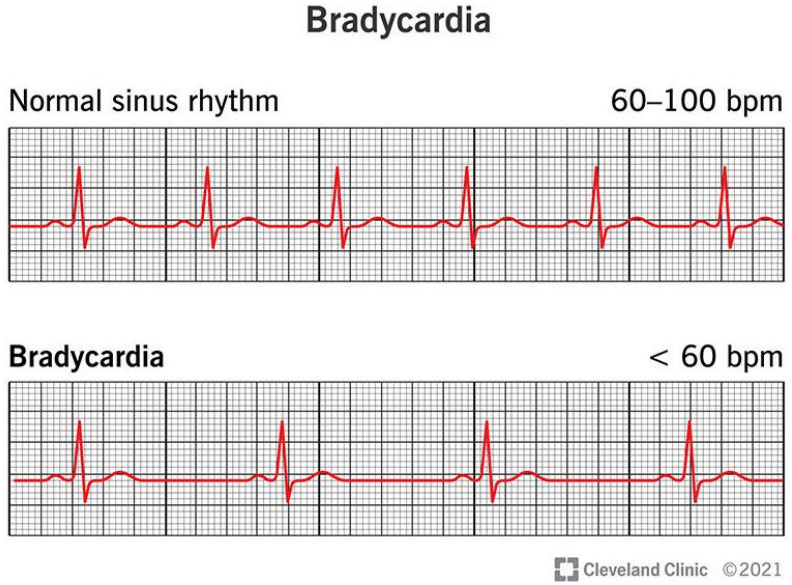
3.Know the Basic Etiologies of Syncope.





What is Syncope?





Syncope :

Happens if the **patient have a sudden, temporary drop in blood pressure or heart rate.** People who have a syncopal episode temporarily lose consciousness but become conscious and alert again after a few seconds or minutes.

It most often occurs when blood pressure is too low and the heart doesn't pump enough oxygen to the brain. It can be harmless or a symptom of an underlying medical condition.

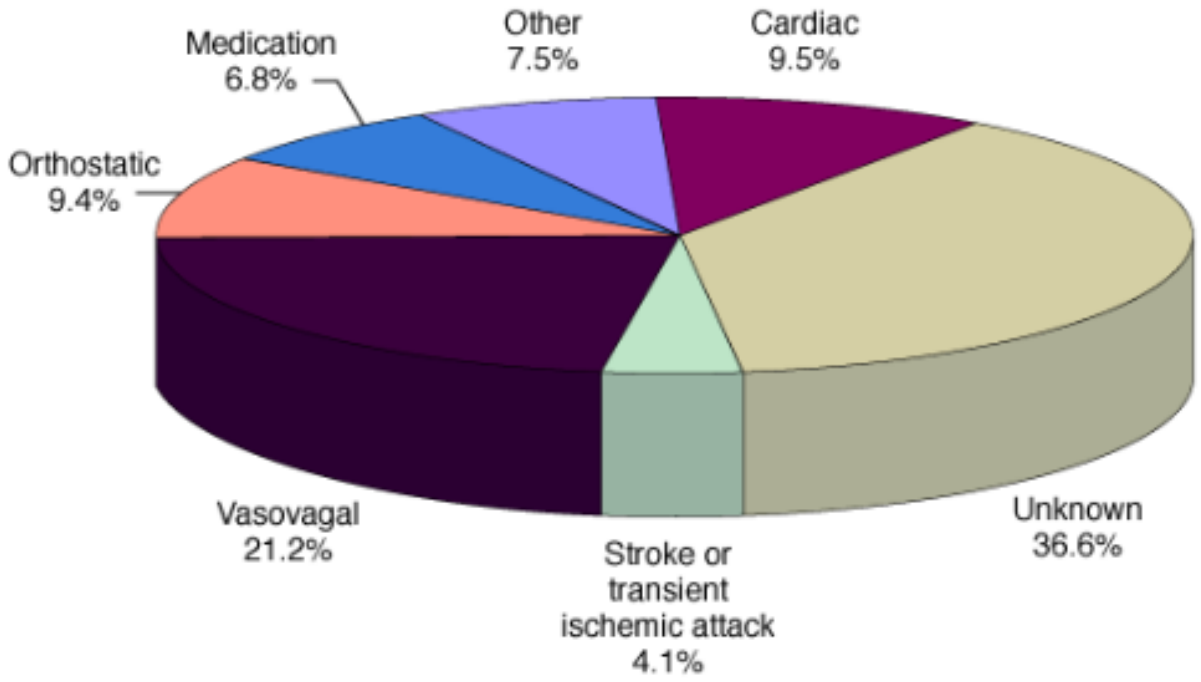


Pathophysiology :

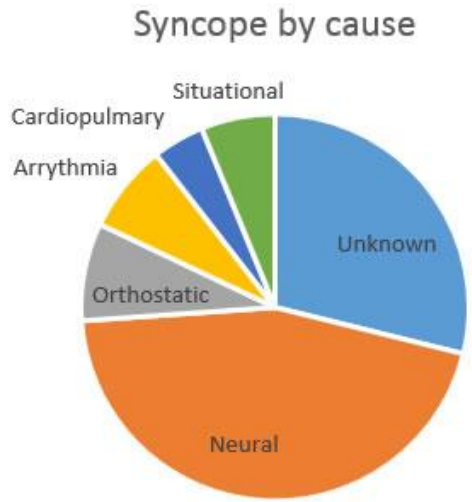
A reduction in systemic blood pressure that causes a decrease in the global cerebral blood flow, which results in loss of consciousness.

A sudden cessation of cerebral blood flow for 6 to 8 seconds has been shown to cause loss of consciousness.

Causes of Syncope







Types of Syncope . . . Etiology

1- Vasovagal syncope:

also called:

Neurally mediated syncope (NMS)

Reflex Syncope,

Neurocardiogenic syncope.

Most common cause of syncope in adults.

is due to **hypotension** produced as a result of sudden vasodilation associated with **Bradycardia**

It’s harmless and rarely requires medical treatment.

This is commonly occurs in strong emotions **(Psychophysiological syncope)**

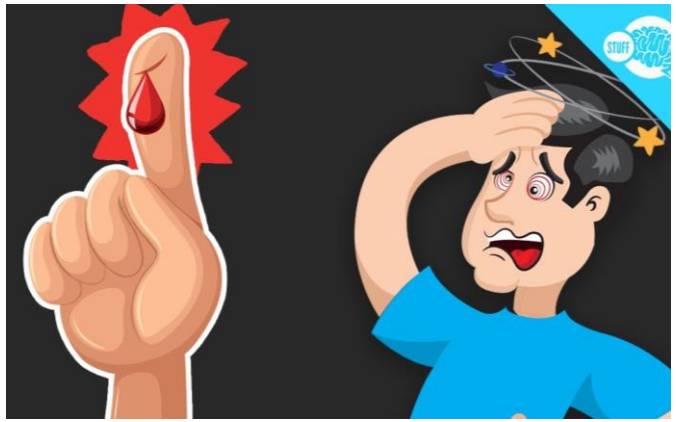


Vasovagal syncope …cont.

The underlying mechanism is **Withdrawal of sympathetic and activation of parasympathetic Systems.**

Triggers for Vasovagal syncope include:

- Pain/Noxious Stimuli
- Blood drawn, being exposed to the sight of blood.
- Receiving upsetting news - emotional stress
- Sudden fright or standing for long periods of time (e.g.Soldiers)
- Fear.
- Heat exposure.

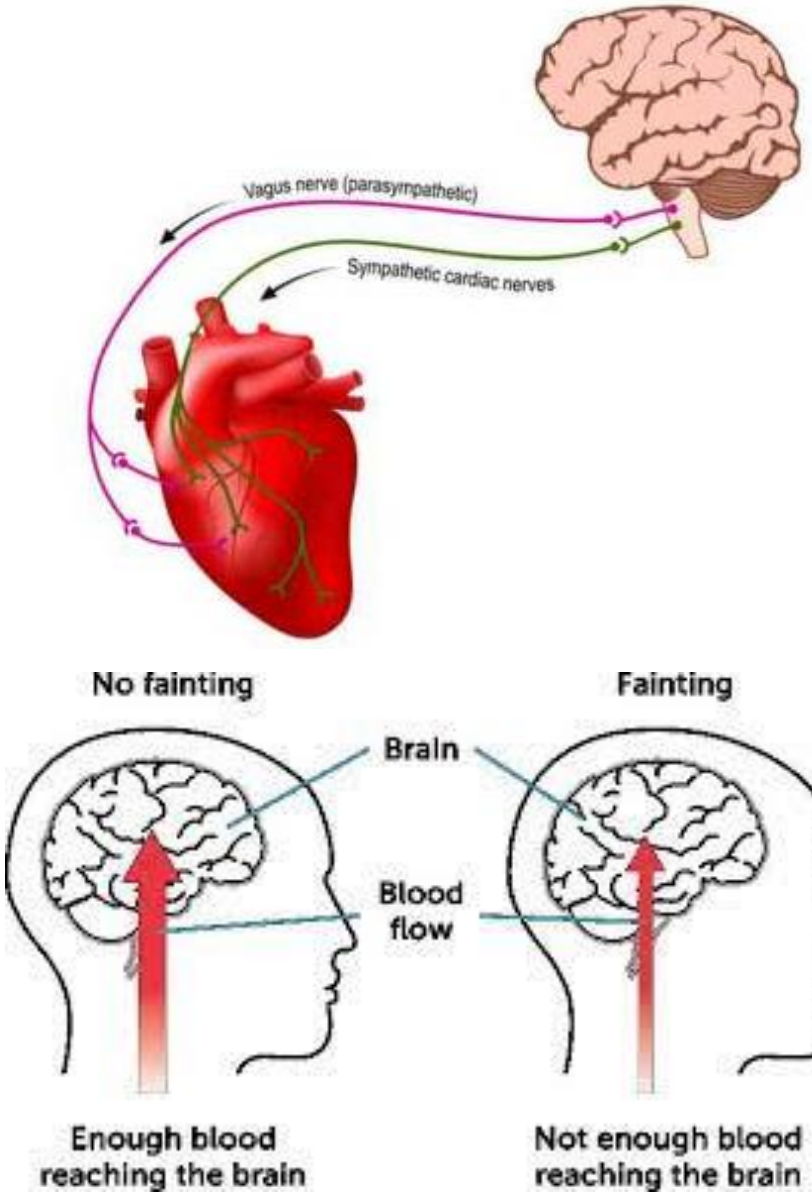


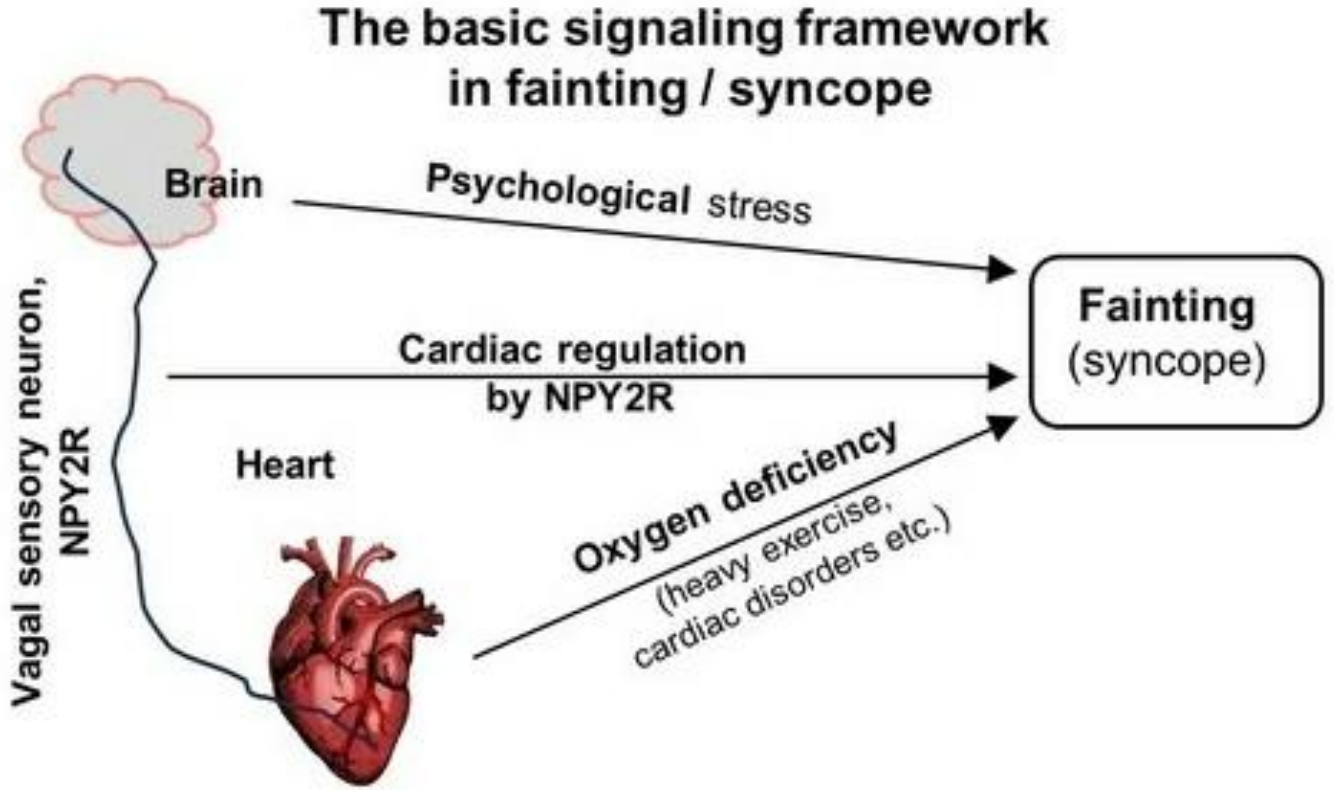






Vasovagal syncope …cont.





Vasovagal Syncope …cont.

- Vasovagal syncope has **three distinct phases**:

1- Prodrome :

Diaphoresis, epigastric discomfort, weakness, nausea, dizziness

Lasts about 2 minutes

2- Loss of consciousness:

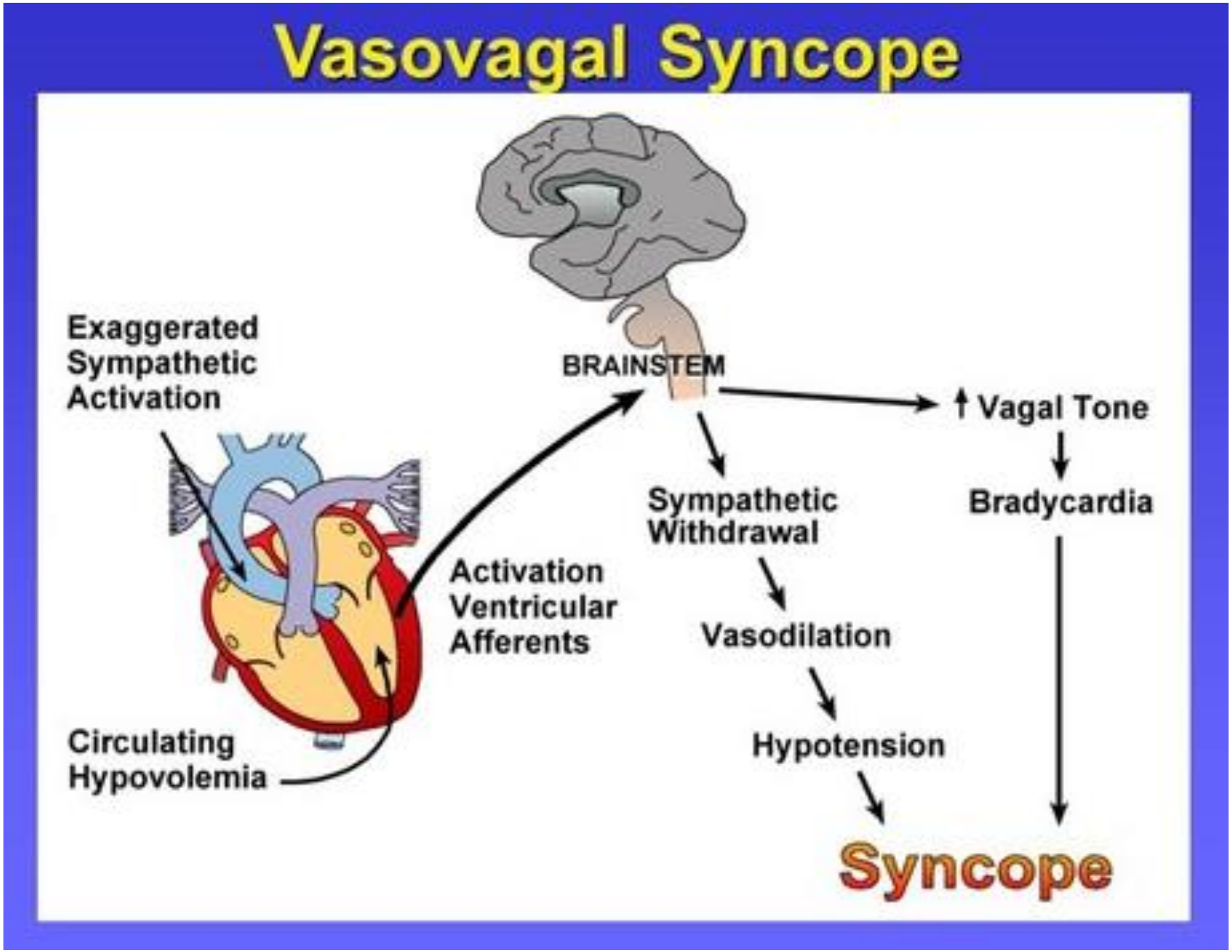
Usually lasts 5-20 seconds

3-Postsyncopal phase:

Nausea, dizziness, general sense of poor health

If present, confusion which lasts no more than 30 seconds

Vasovagal Syncope …cont.



In summary …Vasovagal Syncope

- **Vasovagal syncope — One of the most common types of syncope is called vasovagal syncope or neurocardiogenic syncope.**

- A variety of conditions can trigger vasovagal syncope, including physical or psychological stress, dehydration, bleeding, or pain.

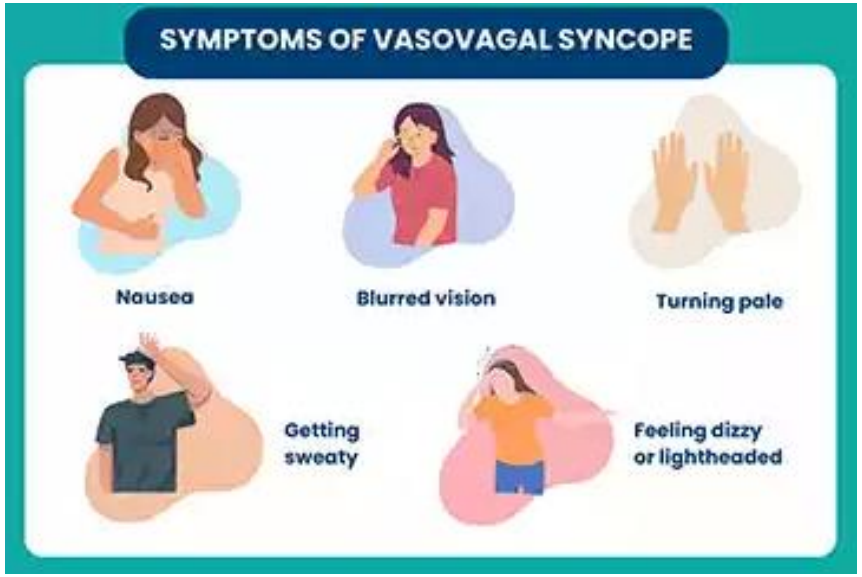
- The **heart rate slows** dramatically and the blood vessels in the body expand, causing blood to pool in the legs, resulting in low blood pressure (**hypotension**). This causes a **decrease in blood flow to the brain.**



In summary …Vasovagal Syncope

- In some cases, vasovagal syncope is **triggered by an emotional response to a stimulus**, such as fear of injury, heat exposure, the sight of blood, or extreme pain.
- In other cases, it is **caused by abnormal nervous system responses to activities** such as urinating, having a bowel movement, coughing, or swallowing.
- In most cases of vasovagal syncope, some warning that you are near fainting. **These signs include dizziness**, **nausea, pale skin, "tunnel-like" vision, and profuse sweating**. After the episode, symptoms may continue because of continued low blood pressure.
- Vasovagal syncope **can occur after prolonged upright posture** that results in pooling of blood in the lower extremities and diminished intracardiac blood volume **(also called postural syncope).** This phenomenon is exaggerated if combined with dehydration.







Syncope (Fainting) ..Etiology ..cont.

2- Syncope due to reduction in venous return; by the increased intrathoracic pressure:



This reduces the cardiac output leading to hypotension:



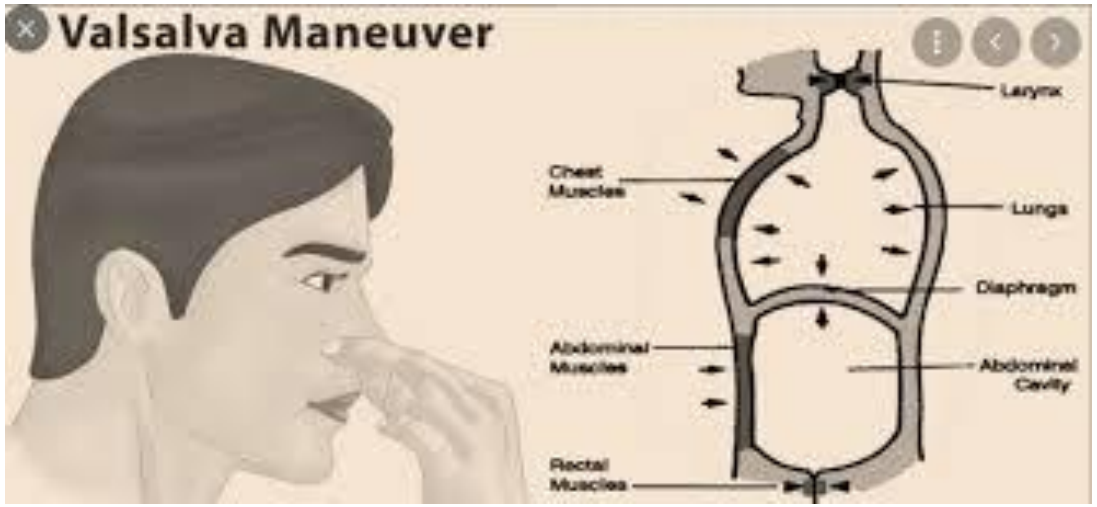
- **Difficult Micturition syncope:** hypotension; in addition to reflex Bradycardia induced by voiding urine.
- **Difficult Defecation syncope**.
- **Cough syncope.**
- **Painful swallowing**.
- **Straining:**

  such as to have a

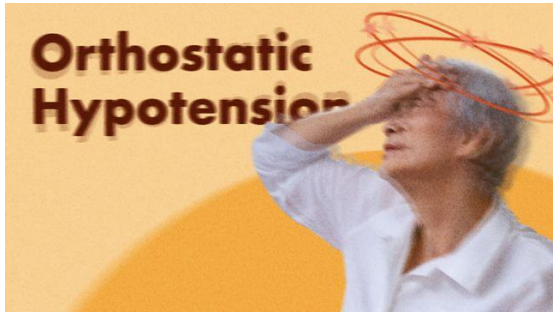
  bowel movement

- **Valsalva maneuver** : → →



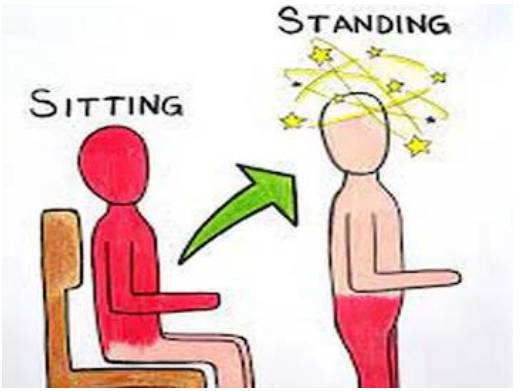


3- Orthostatic syncope or Hypotension:

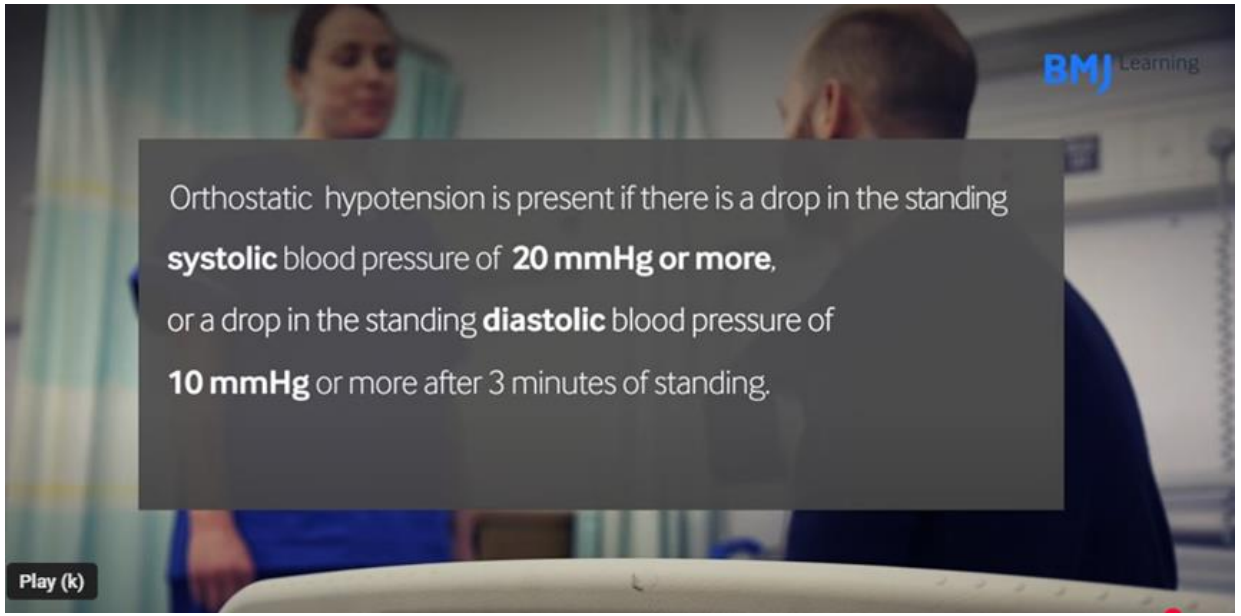


It means a rapid hypotension that occurs on sudden standing **(Drop in BP: 20 systolic or 10 diastolic within 3 minutes of standing).** It is accompanied by dimness of vision, dizziness and even fainting.





It may occur in **normal persons**, in **hypovolemia**, **idiopathic**, and in patients with diseases that **damage the sympathetic nervous system** e.g., diabetes and syphilis, and in primary autonomic insufficiency (decreased production of catecholamines).



3- Orthostatic syncope or hypotension …cont.

It results from **failure of the baroreflex** to compensate for the sudden downward gravitational pull on the blood.

On standing from supine position, the effect of gravity leads to **pooling of blood in the lower part of the body →**

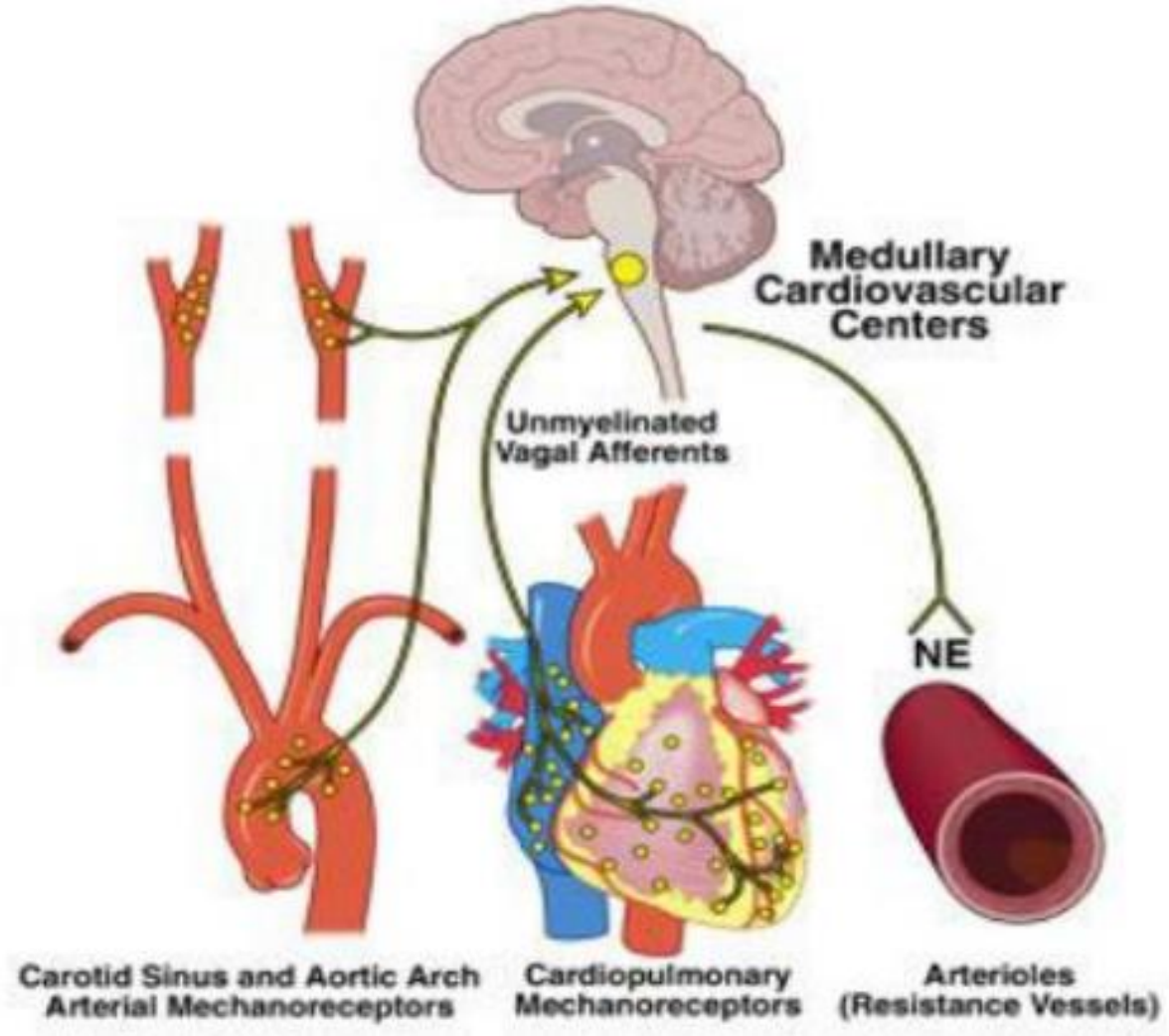
Decrease in cardiac output →

Decrease in arterial blood pressure (Orthostatic hypotension) →

Decreased cerebral blood flow →

Brain ischemia →

Orthostatic syncope or fainting



Orthostatic syncope or hypotension …cont.

Tilt Table Test:

shows how the body reacts to changes in position. It can help find the cause of fainting or dizziness



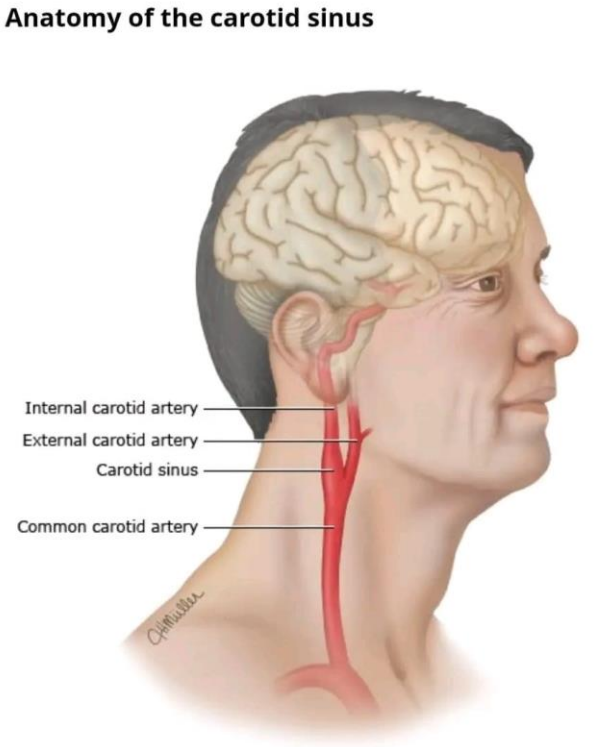
Syncope (Fainting) ..Etiology ..cont.

4- Carotid sinus syncope;

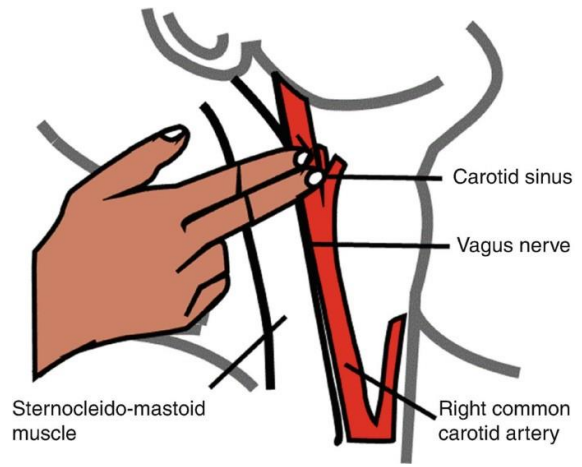
Carotid sinus syndrome.

Carotid sinus syndrome (CSS) is a type of **reflex syncope** or near-syncope with symptoms (eg, syncope, lightheadedness) caused by **carotid sinus hypersensitivity (CSH)** manifesting during activities of daily life that put pressure on the carotid sinus (eg, turning the neck, looking upward). **When CSS manifests as syncope it is called carotid sinus syncope.**

- **An external pressure on the carotid sinus area might produce syncope due to reflex slowing of the heart rate and peripheral vasodilation**.

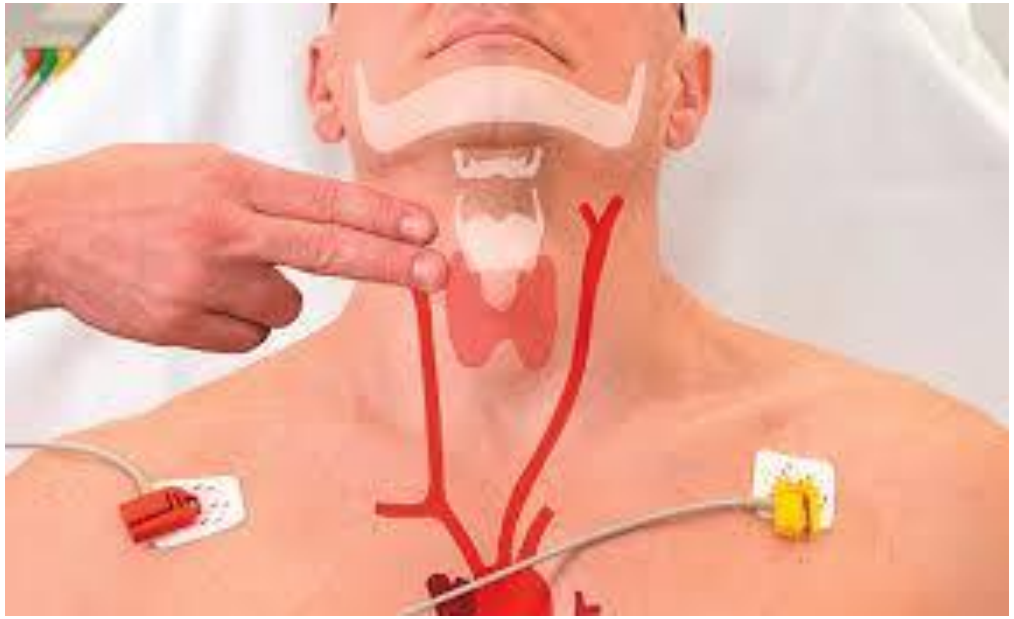


The carotid sinus is located at the base of the internal carotid artery just superior to its bifurcation from the external carotid artery.



Carotid sinus syndrome … cont.

In these patients, the **pressure receptors (baroreceptors) in the carotid sinus region of the carotid artery walls are excessively sensitive**. Therefore, even mild external pressure on the neck elicits a strong baroreceptor reflex, causing **intense vagal- acetylcholine effects on the heart, including extreme bradycardia**. **Sometimes this reflex is so powerful that it actually stops the heart for 5 to 10 seconds, leading to loss of consciousness (syncope).**



Carotid sinus syndrome … cont.

- On the same basis, an attack of paroxysmal atrial tachycardia can be terminated by initiating a **carotid sinus massage**.





Syncope (Fainting) ..Etiology ..cont.

5- Cardiogenic syncope;

Reduced cardiac output:

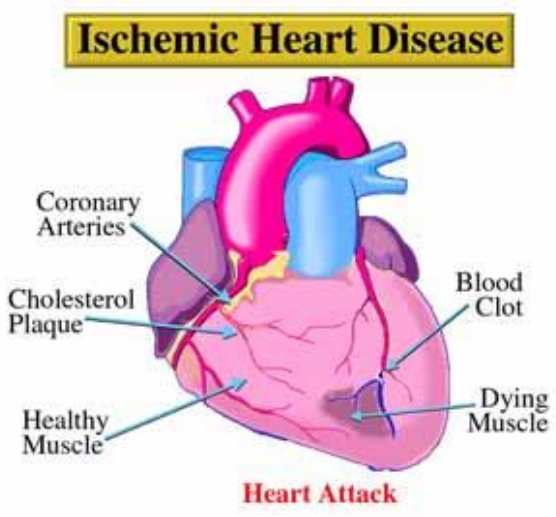
Cardiac syncope is a transient loss of consciousness due to a defect, either **structural or electrical** cardiac defect which prevents the generation of enough cardiac output to send its freshly oxygenated blood to the brain.

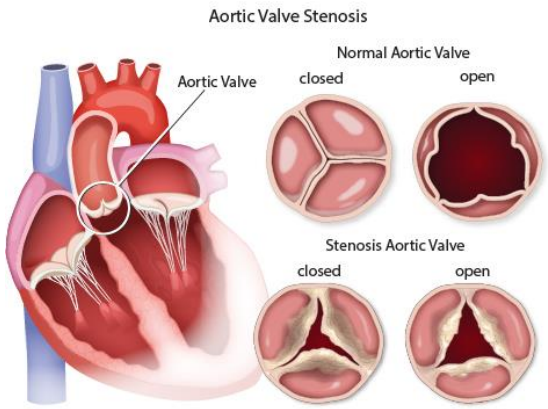
Structural:

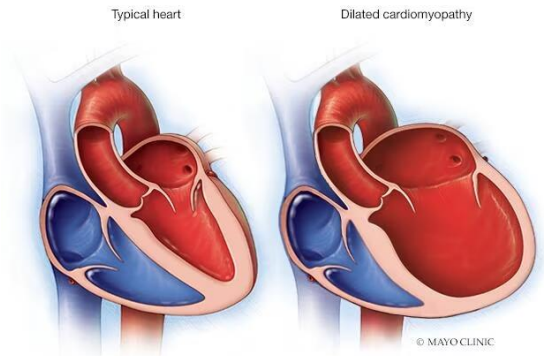
1- Ischemic Heart Disease (most common structural cardiac etiology of syncope) e.g.Myocardial Infarction.

2-Valvular abnormalities (second most common structural etiology, most commonly aortic stenosis)

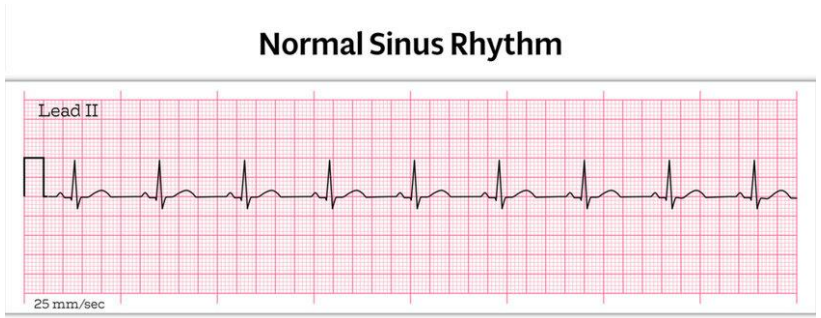
3- Nonischemic/Dilated cardiomyopathy (third most common structural etiology)

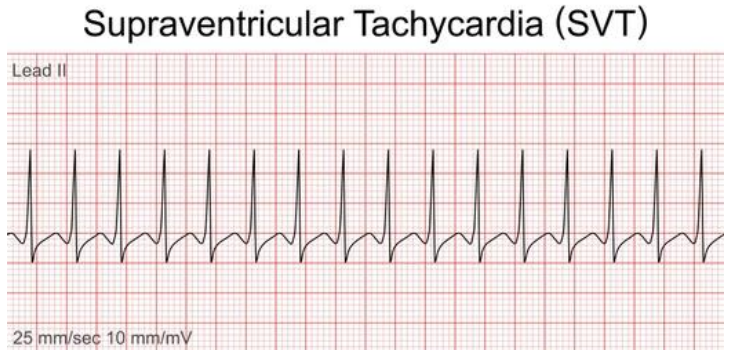






Cardiogenic syncope …cont.



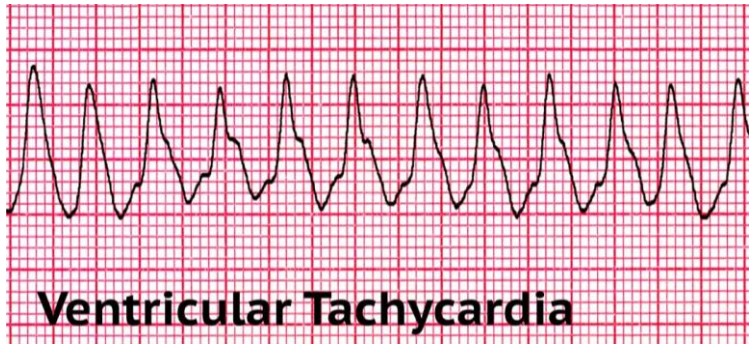


Electrical :

1-Tachyarrhythmia :

Supraventricular (examples: atrial fibrillation, atrial flutter, paroxysmal supraventricular tachycardia (PSVT)

Ventricular : Ventricular Tachycardia



2- Bradyarrhythmia :

Sinus node dysfunction

Atrioventricular conduction block.





3- PR interval disorders/accessory conduction pathways :

Wolff-Parkinson-White (WPW) syndrome




Thank You