

A FEW COMMON OUTPATIENT CARDIAC SIGNS AND SYMPTOMS IN THE PEDIATRIC AGE GROUP

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CHEST PAIN
HEART SOUNDS
SYNCOPE
PALPITATION

•CHEST PAIN:

- Accounts for 0.25% to 0.6% of visits both in the outpatient setting and the emergency department
- Cardiac causes typically account for fewer than 5% of chest pain cases in children and adolescents
- The mean age of complaint is 11-14 years but it can occur in those as young as 4 years old

• **ETIOLOGY:**

↳ **Musculoskeletal** : the most common

- Chest-wall trauma
- Rib fracture
- Muscle strain
- Costochondritis
- Pericordial catch syndrome
- Slipping-rib syndrome
- Hypersensitive xiphoid syndrome
- Tietze syndrome

٢-Pulmonary

- Asthma/reactive airway disease
- Pneumonia
- Pneumothorax
- Pneumomediastinum
- Pulmonary embolism
- Chronic cough

३-Cardiac:

- ALCAPA
- Kawasaki disease
- Supraventricular tachycardia
- Ventricular tachycardia
- Pericarditis
- Myocarditis
- Hypertrophic cardiomyopathy
- Aortic stenosis, dissection and Pulmonary stenosis

५-**Psychogenic :**

- Hyperventilation
- Anxiety

६-**Gastrointestinal :**

- Gastro-esophageal reflux
- Esophagitis
- Gastritis
- Foreign body ingestion

Δ-Other:

- Herpes zoster
- Sickle cell disease
- Pleurodynia
- Pleural effusion
- Thoracic malignancy/masses
- Breast tenderness
- Idiopathic chest-wall pain

Medical Evaluation :

- A thorough history
- Physical examination(heart, lung, neck, extremity, and abdomen, palpate the costochondral joints and other areas of the chest
- Family history of unexplained drowning, car accident, syncope, and sudden infant death syndrome (SIDS)
- Associations like presyncope, syncope, sweating, nausea, palpitations, cyanosis, or dyspnea and chest pain with exercise is important

Appropriate criteria for TTE in chest pain :

- **(١) Appropriate**

- Exertional chest pain
- Non exertional with abnormal ECG
- Family history of SUD or cardiomyopathy

- **(٢) May be appropriate**

- Signs of cardiac disease, normal ECG and benign family history
- Family history of premature CAD
- Recent onset of fever
- Recent illicit drug use

- **(३) Rarely appropriate**

- No other signs, benign FH and normal ECG
- Non-exertional with normal or no recent ECG
- Reproducible with inspiration or palpation

- Resolution of chest pain in 58% of patients when questioned ५ weeks to ५ years after initial evaluation of their chest pain

• **Which CP needs more attention?**

- CP associated by faint or Syncope
- CP after palpitation
- CP in CHD
- CP with activity
- CP with typical anginal pain
- CP in Hyperlipidemia
- CP with positive physical sign
- CP with ECG changes

HEART MURMURS:

- Listen to the four valve areas and left sternal border

Innocent Murmurs :

- Heard in 50% or more of children particularly at around 3 or 4 years of age
- Accentuated by increased cardiac output, as when a child is excited, anemic, or febrile
- Low in intensity, and frequency, not harsh
- Most with the exception of the venous hum, are systolic ejection

- **Still's Murmur :**

- Most common
- Systolic ejection murmur grade I to III/VI
- Heard loudest somewhere between the left lower sternal border and the apex , best with the patient supine
- Varies significantly with respiration, becoming softer and less vibratory during inspiration
- Causes : smaller aortic size, left ventricular false tendons, exaggerated vibrations with ventricular contraction, and increased cardiac output

- **Pulmonary Flow Murmur of Childhood :**

- Innocent systolic ejection murmur
- Commonly in thin-chested adolescents (8-14 years of age)
- Heard maximally over the pulmonary area
- Frequently heard in patients who have increased cardiac output from fever, anemia, or pregnancy

- **Pulmonary Flow Murmur of Infancy :**

- Ejection murmur that radiates from the left upper sternal border over the lung fields to both axillae and the back
- The relatively small size of the branch pulmonary arteries after birth

- The angle of the takeoff from the main pulmonary artery during the newborn period
- Usually disappears by 9 months of age

- **Venous Hum :**

- The only innocent murmur that is not systolic ejection
- Truly incessant when the patient is upright
- Cease with maneuvers that occlude the neck veins, either by direct compression using a thumb, or by turning the patient's head to look over the contralateral shoulder
- Disappear with the patient flat in a supine position

Heart Murmurs :

- **Intensity**

- Grade I. Barely audible and may require several cycles to detect
- Grade II. Soft, but easily audible
- Grade III. Moderately loud murmur without a thrill
- Grade IV. Loud murmur with a thrill
- Grade V. Loud murmur heard with the stethoscope barely off the chest
- Grade VI. Loud murmur heard without the stethoscope touching the chest

Timing :

- systolic murmurs: Ejection => AS,PS
 - S\ coincident= holo=pan=>VSD, MR,TR
- Diastolic murmurs: Early diastolic => AR,PR
 - Mid diastolic => MS,TS
 - Late diastolic/presystolic(rare) => MS,TS
- Continuous murmurs => PDA, AVM, Shunt, collaterals

•Syncope :

- Transient, self-limited loss of consciousness with an inability to maintain postural tone that is followed by spontaneous recovery.
- The circumstances of the event and presyncopal symptoms are of greatest importance.
- Patients should be asked to describe where they were, what they were doing, and how they felt at the time of the event

- Dizziness or light-headedness, visual changes, feeling hot, or nausea often precede postural syncope
- The patient's daily intake of fluids and caffeine is important
- Syncope without prodrome should be considered more significant for the possibility of a sudden severe arrhythmia

- **History** and **physical examination** are the most specific and sensitive ways of evaluating syncope:
- Precipitating factors
- Activity the patient was involved in before the event
- Position the patient was in when the event occurred

- **The following questions should be asked:**

- Was loss of consciousness complete?
- Was loss of consciousness with rapid onset and short duration?
- Was recovery spontaneous, complete, and without sequelae?
- Was postural tone lost?

- **PRESYNCOPE:**

- Is sensory or postural impairment, without complete loss of consciousness.

- **Signs and Symptoms:**

- Nausea
- Vomiting
- Dizziness
- Pallor
- Diaphoresis
- Blurred vision
- Abdominal pain

Classification :

- **Reflex (neurally-mediated) syncope**
- ***Vasovagal:***
 - Emotional distress
 - Orthostatic stress
- ***Situational:***
 - Cough, sneeze
 - Gastrointestinal stimulation
 - Micturition
 - Others

- **Orthostatic hypotension syncope**

- ***Volume depletion:***

- Inadequate fluid intake (hot weather), diarrhea, vomiting, etc.

- ***Drug-induced orthostatic hypotension:***

- Alcohol, vasodilators, diuretics, beta-adrenergic blockers

- ***Primary autonomic failure:***

- Pure autonomic failure, multiple system atrophy, Parkinson's disease with autonomic failure, Lewy body dementia

- ***Secondary autonomic failure:***

- Diabetes, amyloidosis, spinal cord injuries

- **Cardiac syncope (cardiovascular)**

- *Arrhythmia:*

- **Bradycardia:**

- Sinus node dysfunction, atrioventricular conduction system disease
- Implanted device malfunction

- **Tachycardia:**

- Supraventricular including atrial fibrillation
- Ventricular (idiopathic secondary to structural heart disease, or due to channelopathies)

- ***Structural disease:***

- Cardiac valvular disease,
- Acute myocardial infarction/ischemia
- Hypertrophic cardiomyopathy
- Cardiac masses (atrial myxoma, tumors, etc.)
- Pericardial disease/tamponade
- Congenital anomalies of coronary arteries
- Prosthetic valves dysfunction
- Other cardiovascular: pulmonary embolus/hypertension, acute aortic dissection

- **HUT TEST:**

- No golden standard, however Sensitivity (75%), Specificity (90%)

- **Indications:**

- Recurrent unexplained syncope
- Syncope causes body injury
- Syncope during driving
- Recurrent seizure with normal EEG
- For assurance and R/O other causes
- Monitor therapy

- **Response to HUT Test:**

- Cardioinhibitory (4%)
- Vasodepressor (67%)
- Mixed (27%)

• **Treatment :**

- Depends on the cause or precipitant of the syncope
- **Situational syncope** => Patient education regarding the condition
- **Orthostatic syncope** => Patient education; additional therapy in the form of thromboembolic disease (TED) stockings, mineralocorticoids, and other drugs (eg, midodrine); elimination of drugs associated with hypotension; intentional oral fluid consumption
- **Cardiac arrhythmic syncope** => Antiarrhythmic drugs or pacemaker placement
- **Cardiac mechanical syncope** => Beta blockade; if valvular disease is present, surgical correction

• PALPITATION:

- Perceived abnormalities of the heartbeat characterized by awareness of cardiac muscle contractions in the chest, which is further characterized by the **hard, fast and/or irregular beatings** of the heart'
- Palpitation can be associated with anxiety and does not necessarily indicate a structural or functional abnormality of the heart
- Associated symptoms include dizziness, shortness of breath, sweating, headaches and chest pain.

- **Palpitation may be associated with**

- 1- Coronary heart disease, HCM
- 2- hyperthyroidism
- 3- Asthma and emphysema; previous chest surgery
- 4- Kidney disease
- 5- Blood loss, anemia
- 6- Drugs such as antidepressants, statins, alcohol, nicotine, caffeine, Cocaine and amphetamines
- 7- Electrolyte imbalances of magnesium, potassium and calcium; and deficiencies of nutrients such as iron, vitamin B₁₂

- However, palpitations in children typically arise from physiologic stimuli, such as fever, exercise, anxiety, or anemia.
- Children with a serious underlying cause for their palpitations often have a history of syncope, congenital heart disease, or cardiac surgery.

- **The most important clue to the diagnosis :**

- Description of palpitation
- The age when first noticed
- The circumstances under which it occur
- Does it stop by deep breathing or changing body positions
- How they start and stop (abruptly or not)
- whether or not they are regular
- How fast the pulse rate is during an attack
- Way of stopping the palpitations

- **Life threatening causes:**

- Arrhythmia
- Myocarditis
- Hypertrophic cardiomyopathy
- Toxin exposures
- Pheochromocytoma and paragangliomas

- **Common causes:**

- Fever
- Anemia
- Exercise
- Emotional arousal
- Psychiatric distress
- Hyperventilation

- **Patient Evaluation:**

- 1-**History**

- Illness/fever (myocarditis, ARF)

- *Family history*

- Sudden cardiac death or deafness raises clinical suspicion for genetic disorders such as long QT syndrome and hypertrophic cardiomyopathy .

- 2-**Physical Examination**

- **Patient Evaluation:**

- In the acutely symptomatic patient with palpitations, monitoring and assessment of the cardiac rhythm is vital.
- A standard 12-lead ECG and rhythm strip
- Signs of Wolff Parkinson White and long and short QT syndromes.
- May need: Hb or TFT, or Cardiac troponin level & CKMB

- With an acute tachyarrhythmia, should obtain an echocardiogram to evaluate myocardial function, as well as to evaluate for underlying structural heart disease.
- ECG Holter or Loop Recorders
- PR Count by Parents

•THANK YOU