Paediatric Cardiology

Palpitations in Children; How to assess, reasons to escalate or to reassure?

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1. Introduction:

This guidance is intended to provide guidance for paediatricians and GPs on the assessment of a child or young person complaining of 'palpitations'; to elucidate exactly what they mean by that, assess for other concerning features, consider any baseline investigations, and whether or not cardiology referral is indicated.

Most people are occasionally aware of the sensation of their own heartbeat, and some are more so than others. Particularly in times of anxiety or distress, the heart rate rises, and the 'heartbeat' becomes more forceful, and people can become even more aware of their own heart rhythm. Respiratory variation in the heart rate (sinus arrythmia) is normal and often pronounced in children.

Ectopics(whether atrial or indeed ventricular) are also normal from time to time, and the compensatory pause means that the next heartbeat is more 'forceful' due to greater stroke volume. All of these normal changes in heart rhythm can at times cause anxiety and be described as 'palpitations.
This does not apply to children and young people with a known underlying diagnosis.

2. Palpitations in Childhood; Who to refer, and degree of urgency?

What people mean by 'palpitations' varies but in general it is best described as an unpleasant awareness of one's own heartbeat due to speed, strength or irregularity. Sometimes parents will report having seen or felt these through the chest wall or neck pulsation. Increasingly concerns are being raised from heart rate measurements from smart watches. It is important to know whether the palpitations occur in isolation or in association with other symptoms such as shortness of breath, chest pain, abdominal pain, neck pain, feeling weak, visual disturbance, headache and dizziness.

So the key question for any potential referrer is whether or not it is likely the patient has an arrhythmia?**Table 1 provides some useful clarifying questions to ask:-**

Table 1 Is it more likely to be an arrhythmia?
Some useful questions to ask as part of the history

How frequently do the episodes occur?	The frequency of arrhythmic episodes is clearly variable, but SVT most commonly occurs every few weeks to months, sometimes in runs[1]. When multiple daily episodes are being reported, underlying arrhythmia is usually less likely.
How long do the episodes last?	Episodes that only last a few seconds are unlikely due to any concerning or sustained arrythmia[1].
How do the episodes start/stop?	Sudden abrupt onset and offset is quite suggestive of arrhythmia. A gradual speeding up at the start or slowing down at the end of an episode is less suggestive of this.
When do they occur? Does anything trigger them?	Most episodes of SVT are triggered by an ectopic beat and occur randomly, often at rest. While exertion can trigger SVT in some patients, this is not the case for the majority (as faster heart rates typically suppress ectopic beats). Conversely sinus tachycardia is much more commonly felt with exercise. Catecholaminergic polymorphic ventricular tachycardia (CPVT) is associated with exertion, but most commonly presents with syncope.
Does anything stop them?	If an action (such as swallowing cold water, vomiting or Valsalva manoeuvre) has been found to acutely stop an episode, this makes arrhythmia more likely.
Have you been able to count/tap out/document heart rate?	A heart rate <180 bpm makes arrhythmia less likely.
Drugs/medication?	High caffeine intake (often in energy drinks), use of stimulant medications (e.g. with attention deficit hyperactivity disorder) or illicit substances can increase the chance of arrhythmia, but also increase the likelihood benign palpitations from sinus tachycardia.
SVT: Supraventricular Tachycardia	

Asking (and encouraging, if necessary, by demonstrating) the child / parent to tap out the rate / sensation onto the desktop is a very good way of determining more exactly what is being described and the rate of any tachycardia. A heart rate of <180 is very unlikely to be arrhythmic.

Consider what else might underlie the symptoms? Investigate any indicated; -

Table 2: Non-Cardiac Causes of Palpitations

- Fever
- Dehydration
- Autonomic dysfunction, POTS, vasovagal symptoms
- Anemia
- Thyroid disorder
- Electrolyte imbalance, hypoglycemia
- Anxiety
- Medications (including beta-agonists (inhalers), stimulants)
- Caffeine use (including energy drinks)
- Alcohol use
- Illicit drugs
- Neoplasm (pheochromocytoma)

NB: most of these should be investigated in primary care / general paediatrics and do not need cardiology input.

2.1 Red Flags; -

Red flags (refer/act now)	Green flags (reassure / routine follow-up)
• Syncope or presyncope with palpitations, especially during or right after exercise • Sustained tachycardia or HR ≳ 190 bpm; hemodynamic compromise (hypotension, pallor, poor perfusion, altered consciousness) • Chest pain + palpitations with exertion; dyspnoea/orthopnoea • Known congenital/acquired heart disease or primary electrical disease • Family history (1st/2nd degree or multiple on one side) of SCD, cardiomyopathy, channelopathy, arrhythmia, or ICD/PM • New pathologic murmur/gallop, displaced apex, signs of heart failure • Substance/medication trigger with pro-arrhythmic potential (stimulants, some OTC cold meds, QT-prolonging drugs)	• Brief, infrequent flutters (< 30 s), no syncope, normal activity tolerance • Occurs with stress/anxiety, fever, dehydration, or caffeine/energy drinks and resolves with rest/hydration • Normal exam (no pathologic murmur, no signs of HF); vitals stable • Family history negative for cardiomyopathy/channelopathy/SCD • Symptoms improve with Valsalva or hydration; benign ectopy suspected • Associated with postural hypotension (manage as for this)

Syncope due to arrhythmia is usually secondary to ventricular arrhythmia and is uncommon. It is also commonly the presentation rather than following a period of 'palpitations'; it is unusual for even prolonged atrial arrhythmia to produce syncope, although light headedness / presyncope may ensue. Postural hypotension is often associated with a transient compensatory tachycardia but should be differentia table by the history.

SVT is common in infancy and often resolves for many years, but it may recur in adolescence. Suspected arrythmia in children with repaired congenital heart disease should always be escalated to their cardiologist urgently.
There is increasing awareness of the risk of inherited pro-arrhythmic cardiac conditions; channelopathies and cardiomyopathies, but family history (in first degree relatives) should always be enquired about.

Chest pain with 'palpitations' is often described; it is important to differentiate between the discomfort of an ectopic or post compensatory pause beat, from the 'crushing' chest tightness associated with the rare but concerning actual myocardial ischaemia.

Try and differentiate between conditions needing a cardiologist and those that can be managed elsewhere.

Table 3: Potential differential diagnoses in children with palpitations

Arrythmia	Ectopic beats (atrial or ventricular) Supraventricular ➢ Re-entrant (e.g. AV re-entrant tachycardia) ➢ Atrial (e.g. atrial flutter) ➢ Junctional tachycardia (rare) Ventricular (uncommon) ➢ Normal heart VT (e.g. fasicular VT) ➢ Related to congenital heart disease or cardiomyopathy ➢ Inherited primary arrhythmia syndrome (e.g. long QT syndrome)
Cardiomyopathy	Hypertrophic Dilated Restrictive
Physiological	Anxiety/hyperventilation Exercise Fever Anaemia
Autonomic	Postural orthostatic tachycardia syndrome (POTS)
Endocrine	Hypothyroidism Phaeochromocytoma (very rare)
Pharmacological	Caffeine Prescription medications (e.g. methylphenidate) Illicit substances (cocaine, amphetamines)

2.2 ECG investigations

Does everyone describing palpitations need an ECG?

It is important to take a detailed history as well as a cardiovascular examination. Make sure you understand precisely what is being described. If it is clear that arrythmia is not being described, then strong reassurance (e.g. awareness of ectopics or sinus arrythmia) is entirely appropriate without an ECG.

Otherwise a baseline 12 lead ECG may be undertaken, ideally in primary care but can otherwise be arranged via ED or EMCHC.

If referring to Cardiology for suspected arrythmia then a clear description of events, and their frequency, and any red flags, will enable the triaging clinician to decide whether some ambulatory monitoring would of value prior to the child being seen in clinic.

Smart phone 'ECG' or pulse recordings are not designed for use in children and are often both anxiety provoking and misleading.

3. Education and Training

None

4. Audit Criteria

None

5. Supporting References

Palpitations in children. Kang H, Kumar MR, Hayes N. Arch Dis Child Educ Pract Ed. 2024;109:152-157.doi:10.1136/ archdischild-2023-325817

Archives Palpitations article.pdf

6. Key Words

Cardiac, Cardiology , Arrythmia, Supraventricular Tachycardia

NB: This guideline assumes no underlying diagnosis has been made, as referral may be required depending on the presence of an identified cause.
Referral (or a documented discussion with a specialist) may enhance reassurance, even when a diagnosis of concern is unlikely, but this should be the exception rather than the rule.
Urgency will depend on acuteness of the presentation

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