

Palpitations as a symptom is a common cause for consultation in general, casualty and cardiology practice. The term Palpitation has its roots in the Latin verbs ‘palpare’, ‘palpitare’ meaning patted or touch gently. The diagnostic and therapeutic management of palpitations is often frustrating and confusing both to practitioner and patient. This is because of myriad causes of this symptom and poor reproducibility. From the management point of view causes could range from psychosomatic disorders to life threatening arrhythmias.¹⁻³

Palpitation has been defined as a disagreeable sensation of pulsation or movement in the chest and/or adjacent areas. In resting conditions one does not usually perceive heartbeat. During intense physical or emotional stress it is quite normal to be aware of one’s own cardiac activity making them physiological. Outside of these situations palpitations are abnormal.

Palpitations are a frequent clinical presentation accounting for upto 15-20% of general practice and second to chest pain in cardiology setups. Palpitations originate from a variety of causes, cardiac related in approximately 43% of cases, psychosomatic in 30% and unknown/miscellaneous cause in 27%⁴⁻⁸. Arrhythmias cause palpitations often but significant number of patients with arrhythmias don’t report palpitation as a symptom. There is every need to have a evidence based structured evaluation of patients presenting with palpitations to help us identify patients with more serious conditions.

Palpitations are perceived with still less understood sensory afferent pathways with receptors in myocardial, pericardial or peripheral receptors. These stimuli are transmitted to sub cortical areas and base of frontal lobes⁹. Receptors could be triggered for a variety of reasons as listed in Table 1.

Table 1: Triggers of Arrhythmias	
Variation in heart rate	Arrhythmias (Tachy and Brady), Sinus tachycardia (systemic illness fever, thyrotoxicosis, anxiety etc)
Increase in intensity of contraction	Large increase in stroke volume secondary to Regurgitantvalvular lesions, congenital Shunt lesions, Arteriovenous malformation, hyperdynamic states(pregnancy, anemia etc)
Altered perception of heartbeat	Psychosomatic disorders

To evaluate a particular patient it is important to know the potential causes of palpitations. Possible aetiologies¹⁰⁻¹⁶ have beenlisted in Figure 1.

CLINICAL EVALUATION OF PALPITATIONS

As in any clinical situation a thorough history and examination will help to arrive at an appropriate diagnosis.

For the purpose of clinical clarity four types of palpitations have been identified in practice. Though no clear differentiation is possible four types have been identified¹⁷⁻¹⁸ Figure 2.

Extrasystolic palpitation are usually sudden in onset perceived as a skipped or jumped beat usually interspersed with normal periods.

Tachycardiac palpitations are perceived as rapid flapping movements over the chest could be irregular or regular and be associated with angina, syncope and fatigue.

Anxiety related palpitations are usually associated with slight increase in heart rates and associated with tingling sensations in hands and feet, atypical chest pain etc.

Pulsation is a feeling felt after strong contraction of the heart following increased contractility or stroke volume.

History should be focused and directed to achieve reasonable success in arriving at possible diagnosis.

SITUATIONS LEADING TO PALPITATIONS

- Functional state -sleep, during sport or normal exercise, change in posture, after exercise.
- Positional variation or trigger.
- Precipitating factors -emotion, exercise, squatting.
- Onset of palpitations-Abrupt or slowly arising.
- Premonitory symptoms -Angina, dyspnea, vertigo, fatigue.

TYPE OF PALPITATIONS

Regular, rapid or permanent.

ASSOCIATED SYMPTOMS

Chest pain, syncope or near syncope, sweating, pulmonary edema, anxiety, nausea, vomiting.

TERMINATION EVENTS

Deceleration or sudden, urination, change in other symptoms.

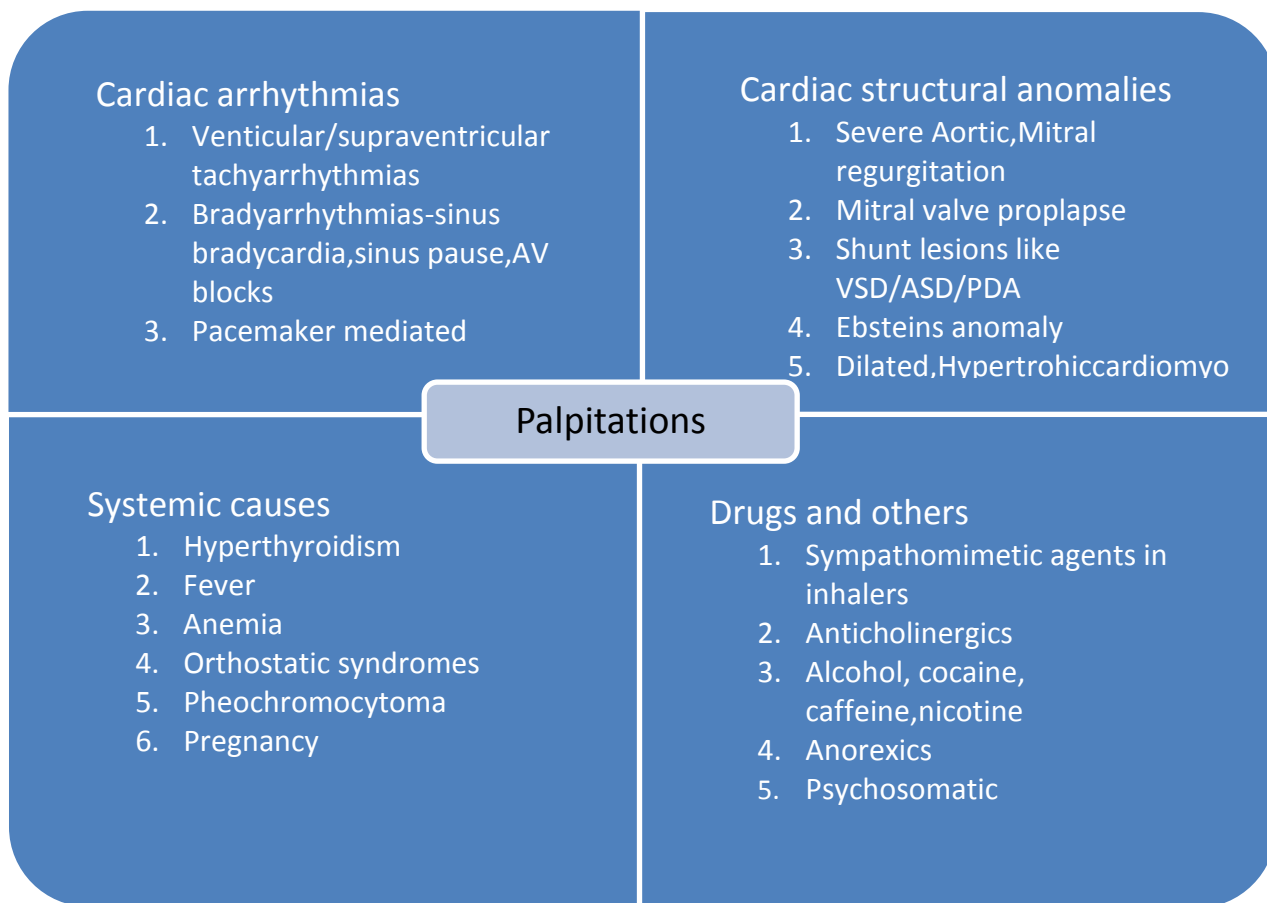


Fig. 1: Aetiology of Arrhythmias

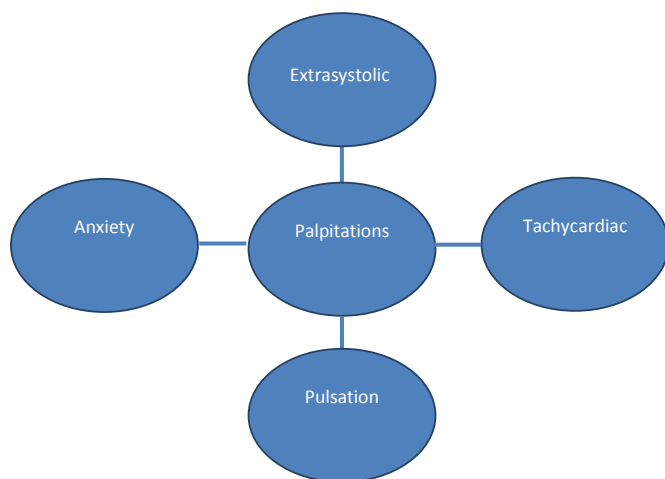


Fig. 2: Types of palpitations

Spontaneously or with vagal maneuvers or drug administration.

PAST HISTORY

Age onset of symptoms, frequency, cardiac disease, psychosomatic disorders, systemic diseases, thyroid disorders, family history of cardiac disease, tachycardia or sudden cardiac death, medications at the time of palpitations drug abuse.

EXAMINATION

Goal is to evaluate the tolerance of a arrhythmia (blood pressure, pulmonary edema, etc), and in case of a sinus

rhythm or sinus tachycardia, to evaluate the presence of systemic disease.

In the absence of palpitations, signs of structural heart disease that could explain the etiology (murmur, clicks, hypertension, valvular heart disease, signs of heart failure).

Systematic analysis of clinical clues help to get idea into the nature of palpitations they are summarized in Figure 3.¹⁹⁻²¹

INVESTIGATIONS

ECG

ECG remains the most appropriate investigation to assess a patient of palpitation. During an episode of arrhythmia ECG provides useful information on rate, rhythm and suitably temporally done also onset and offset. Vagal maneuvers or pharmacological tests with adenosine or other drugs under ECG monitoring provide valuable insights into mechanism and triggers of arrhythmia.

In the absence of arrhythmia ECG provides valuable clues about structural heart disease, arrhythmic substrates and chanellopathies.

ECG CLUES TO CAUSE OF PALPITATIONS

Short PR interval-AVRT, Atrial fibrillation

P-wave abnormalities, Atrial premature complexes-Atrial fibrillation

AVNRT/AVRT	AF	AT/AFL	VT
Sudden onset. Exercise or posture induced, regular in nature. Onset of symptoms from childhood	Continuous or paroxysmal. Effort, alcohol or meal induced. Irregular in nature	Paroxysmal or continuous. Regular in nature except in AV block	Effort induced, regular in nature
Polyuria & frog sign Vagal maneuver termination	Polyuria		Hemodynamic compromise

Fig. 3: AVRT- atrio-ventricular reentrant tachycardia; AT- Atrial tachycardia, AF- Atrial flutter; VT- Ventricular tachycardia

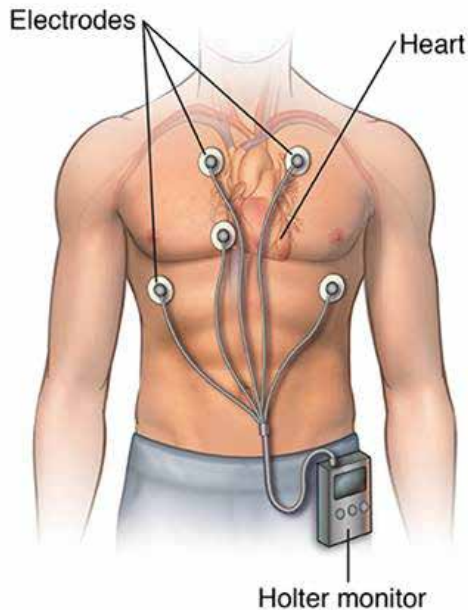


Fig. 4: Holter monitoring



Fig. 5: Event recorder

Left ventricular hypertrophy-Ventricular tachycardia, Atrial fibrillation

Pathological Q wave, epsilon wave (ARVD)[#], brugadapattern*-Ventricular tachycardia/fibrillation

Long or short QT-Polymorphic ventricular tachycardia

Large voltages in precordial leads, T wave changes-HOCM

A-V block, tri- or bifascicular block-Complete heart block, brady- dependent polymorphic ventricular tachycardia

* Right bundle branch block with coved type/saddle type ST segment elevation in the right precordial ECG leads.

[#]epsilon wave and/or T-wave inversion with QRS duration >110 ms in the right precordial ECG leads seen in ARVD-Arrhythmogenic right ventricular dysplasia

ECG MONITORING DEVICES

When symptoms are infrequent and inconclusive it makes sense to use devices which can record and transmit/archive ECG. Devices can record ECG data on a continuous basis or be switched on at the onset of palpitation.

Holter-Recorders connected to the patient by means of skin electrodes; these recorders are able to perform continuous beat-to-beat electrocardiographic monitoring via several leads. Monitoring is usually limited to 1-2 days, useful when palpitations are daily occurrence, cumbersome installation may limit patient activity eliminating several triggers Figure 4.

EVENT RECORDERS

Portable devices applied to skin when symptoms are experienced by patient, single lead data is recorded and/or transmitted. Useful for palpitations whose onset happens weekly or more and last long enough till trigger is switched on. ECG quality may not be good, triggers are not recorded, not suitable when hemodynamic impairment occurs (Figure 5).

EXTERNAL LOOP RECORDER

Connected to the patient on a continuous basis and equipped with a memory loop which can be triggered by patient or automatically. ECG record before the trigger and after is recorded. Useful when palpitations occur weekly or less frequently. Useful for short lasting palpitations and those with hemodynamic impairment. Asymptomatic arrhythmias can be recorded with automatic triggering. Long term usage is inconvenient and less tolerated, Figure 6.

IMPLANTABLE LOOP RECORDERS

When symptoms are less frequent that is monthly or yearly and associated with hemodynamic compromise and all other modalities fail to give definite clue implantable recorders are used. The trigger to record could be externally activated by patient or automatically by device itself²²⁻²⁵ Figure 7.

ECHOCARDIOGRAPHY

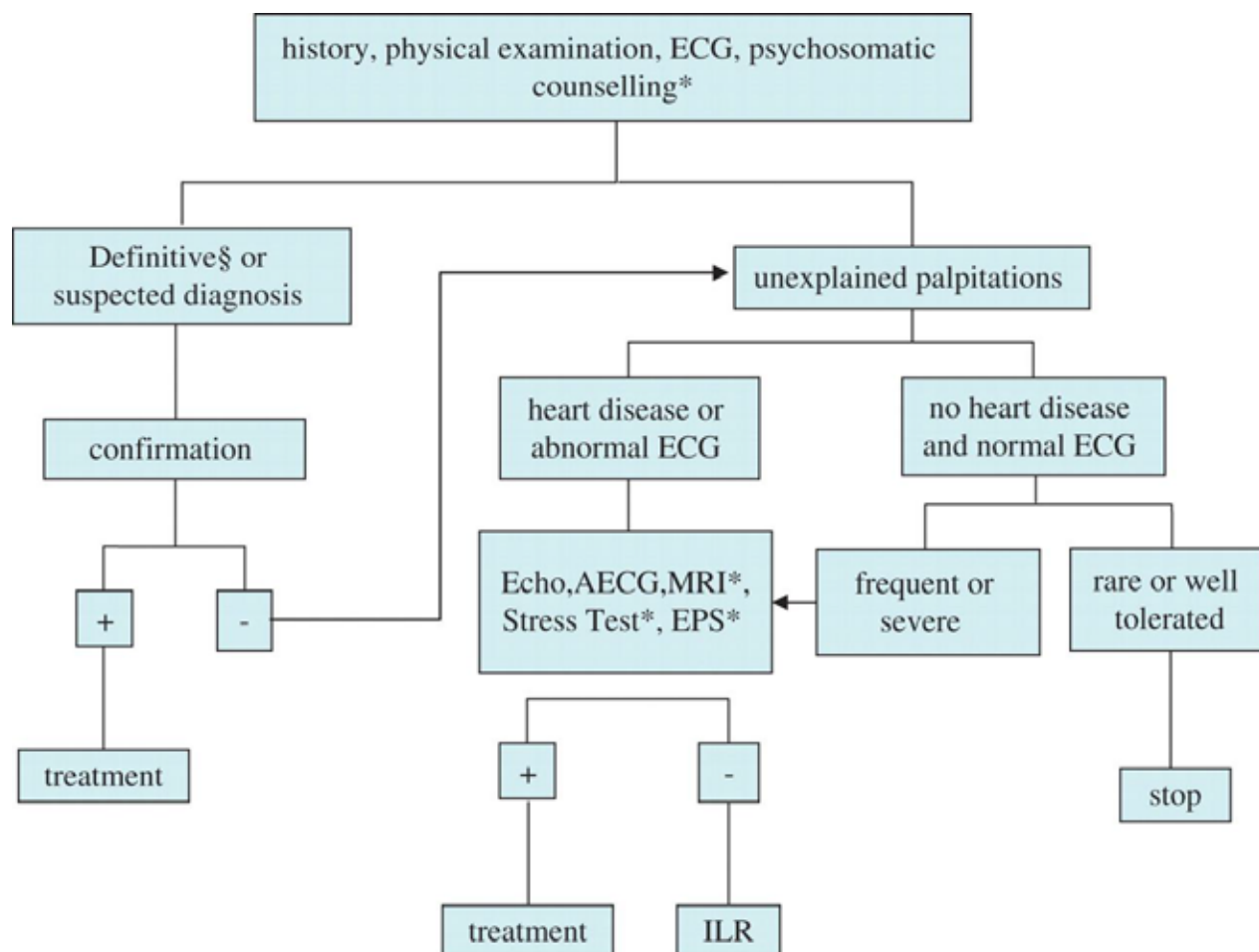
Echocardiography provides a structural and functional



Fig. 6: External loop recorder



Fig. 7: Implantable loop recorder



Suggested diagnostic workup for palpitations

ILR-implantable loop recorder, EPS-Electrophysiological study, AECG-Ambulatory electrocardiogram

assessment of the heart, valvular heart disease such as mitral valve prolapse, mitral and aortic regurgitation. Congenital shunt lesions, left ventricular function, features of ARVD etc provide useful corroborative evidence towards possible etiology of palpitations.

STRESS TESTING

Treadmill or pharmacological stress testing may sometimes be used to identify presence of inducible ischemia as a cause of palpitations, as well as catecholamergic

tachyarrhythmias. The sympathetic state associated with stress identifies triggers to a particular arrhythmia and provides valuable clues to diagnosis. Hemodynamic tolerance to a particular arrhythmia could also be studied during stress testing.

MRI

MRI is emerging as a useful investigation in diagnosing a variety of structural and functional cardiac diseases. Its utility is proven in the diagnosis of arrhythmogenic

72 right ventricular dysplasia which is an important cause of Ventricular tachycardia. It is also useful to identify various lesions like sarcoid granulomas, tumors and tissue characterize them, which in turn could cause various ventricular arrhythmias.

ELECTROPHYSIOLOGICAL STUDY

Electrophysiological studies are usually the last resort, after exhausting all other diagnostic tools. Various pacing and entrainment protocols are delivered to the heart to trigger and consequently diagnose the nature of arrhythmia. EPS also allows for potential ablative therapy of a wide range of tachyarrhythmias.

TREATMENT OF PALPITATIONS

Therapy is focused on the cause (treatment of cardiac arrhythmias, structural heart diseases, psychosomatic disorders, or systemic diseases. When a clear cause is known and a low-risk curative therapy is available (e.g. supraventricular arrhythmias), this is the treatment of choice. In many benign arrhythmias (e.g. premature beats), a number of general factors may influence and modulate the frequency and severity of the symptoms. changes in lifestyle (e.g. reducing coffee or alcohol) or non-cardiologic therapies (e.g. anxiolytic drugs or psychiatric counselling) may be useful to control symptoms and should be considered. Reassurance of the patient on the benign nature of the disorder can markedly reduce symptoms.

Patients with palpitations may sometimes need to be hospitalized for diagnostic and therapeutic purpose. Diagnostic indications may include structural heart disease for the purpose of cardiac catheterization and hemodynamic assessment, EPS, in hospital telemetry studies etc.

More serious indications to hospitalize include brady arrhythmias requiring pacemaker, ventricular arrhythmias, supraventricular arrhythmias with hemodynamic compromise, pacemaker/ICD malfunctions, signs and symptoms of heart failure and severe structural cardiac abnormality.

CONCLUSIONS

Palpitations are a common clinical presentation with wide ranging etiology. Thorough history and physical examination is required to arrive at an appropriate clinical diagnosis and follow with relevant investigations. Potentially life threatening causes should be ruled out before more benign conditions are attributed as cause of palpitations. Newer tools are increasingly available especially for ambulatory ECG monitoring improving diagnostic yield and accuracy. Simple tools like handheld devices, phones etc could prove useful in the future .

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