10 STEPS Before you refer for: Palpitations

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Introduction

Palpitations are a common presentation in general practice[1] and a frequent reason for cardiology referrals. This symptom often causes considerable distress and anxiety for the patient[2] and can evoke a similar feeling in the consulted healthcare professional. However, palpitations are often benign.[3] Less than half of patients with palpitations suffer from an arrhythmia and not every identified arrhythmia is of clinical or prognostic significance.[4] There is also a high incidence of anxiety disorders among patients presenting with palpitations.[5]

The skill lies in identifying patients with a significant heart rhythm abnormality who can be either helped by treatment or are at risk of adverse outcome. This can be achieved in primary care by taking a careful history and simple investigations.[5]

The provision of services for patients with arrhythmic illness has lagged behind those who suffer from coronary heart disease (CHD). This has been recognised by the addition of Chapter 8 to the National Service Framework for CHD.[6] Timely access to appropriate clinicians and patient support are among the quality requirements, which have been much welcomed by patients.

1. What does the patient actually mean?

Palpitations refer to an abnormally perceived heartbeat and do not necessarily imply heart racing but could mean a slow heart rate, an irregularity or an unusual pounding sensation. Patients use this term correctly in its broadest sense and, therefore, it is crucial to find out what they actually mean. Palpitations are a symptom and these are not necessarily caused by an arrhythmia, as is often assumed by doctors without having taken a good history. At times something different altogether is meant, such as chest discomfort.

The heart rate at the time of palpitations needs to be explored next. 'Too fast to count' might point more towards a tachyarrhythmia. Asking the patient to tap the heartbeat with their hands can help further clarify the rate, and also give an idea about regularity. It has been suggested that regular palpitations are more likely to be associated with an arrhythmia than irregular ones.[7] Short-lived irregularities, such as missed beats, fluttering sensations or extra beats, are often caused by ectopy. It is of value to know the duration and frequency of palpitations to understand the impact on the patient's life, rather than pointing towards a particular aetiology.

Most patients refer to the onset of palpitations as sudden, but fewer can recollect the offset. However, the mode of termination can give valuable clues. For example, patients with paroxysmal supraventricular tachycardias can often recollect the sudden termination of their palpitations.

It is important to find out about the circumstances during which palpitations occur. Does it happen when the patient is at rest or, more significantly, does it happen when at work?[7] Palpitations during exertion are alarming. Can it be brought on by swallowing cold food and drinks or can it be stopped by coughing or breath holding? The former can sometimes be found in atrial flutter while the latter would suggest an AV re-entrant tachycardia.[8]

2. Are there any associated symptoms?

Associated pre-syncopal symptoms and blackouts are alarm symptoms that need to be investigated. It is important to add that serious arrhythmias often present with syncope only and preceding symptoms can be absent. In particular, recurrent unexplained syncope, syncope with injury and syncope during exertion need to be carefully assessed by an experienced physician.

Breathlessness can be a sign of tachyarrhythmia. At times it might even indicate decompensation in the form of heart failure, which can be observed, for example, in patients with atrial fibrillation and a fast ventricular response. This needs to be distinguished from a brief taking away of breath, which patients with ectopy can sometimes experience.

Chest pain can also be associated with palpitations. Some patients might have underlying coronary disease, but a very fast heart rate can cause chest discomfort even in patients with structurally normal hearts.

3. Find out about contributing factors

A history of mental health problems, such as anxiety, depression and somatisation disorders, has been associated with palpitations, which are not necessarily caused by arrhythmias.[9] This is worth exploring in more detail with the patient.

Lifestyle factors can contribute to, or be the cause of, palpitations. High caffeine intake and alcohol abuse influence heart rate and increase the likelihood of ectopy. Alcohol has also been associated with an increased risk of atrial fibrillation.[10]

Unfortunately, the use of illicit drugs is high, especially in the younger generation. Most of these drugs can give rise to palpitations and include, in particular, ecstasy, amphetamines and cocaine.

Prescription medication such as beta-agonists, theophyllines, levothyroxine and calcium channel blockers, to name but a few, can cause palpitations. Particular attention needs to be paid to class I anti-arrhythmic drugs, which have a pro-arrhythmic effect, and new complaints in patients taking these medications always need to be explored carefully.

Lastly, there is an almost endless list of medications that prolong the QT interval and can give rise, although rarely, to very serious polymorphic ventricular tachycardia in susceptible individuals. In particular, doctors need to identify patients who take multiple QT-prolonging drugs. Patients with mental health problems often end up on a cocktail of QT-prolonging drugs, as do patients receiving substitution medication for drug abuse. A list of drugs with an effect on the QT interval can be found at: www.sads.org.uk/drugs_to_avoid.htm

Contributing factors

- Anxiety and depression
- Caffeine
- Alcohol
- Illicit drugs, such as cocaine, amphetamines, ecstasy
- Prescription medication, such as beta-agonists, theophyllines, calcium channel blockers
- QT-prolonging drugs, such as antiarrhythmic drugs, antidepressants, antipsychotics

4. Family history

Taking a careful family history is important and can help to alert the clinician to a potentially inheritable cardiac condition. First, one needs to enquire about any known cardiac conditions in close relatives. The emphasis here is on heart muscle diseases, early onset atrial fibrillation and premature coronary disease. The use of an implantable cardioverter defibrillator (ICD) device in a young person might indicate an ion channel disease.

Second, the issue of sudden cardiac death (SCD) in the patient's family needs to be explored. Deaths under the age of 40 are significant as the likelihood of an arrhythmic death due to an inherited cardiac condition becomes much more likely compared with older patients who usually die suddenly due to coronary disease. The vast majority of inheritable cardiac conditions are autosomal-dominantly inherited and, therefore, the history can focus on first-degree relatives.[11] Unfortunately, up to the not so recent past, SCD might not have always been recognised as such. Therefore, it is advisable to ask a broad question first: was there any unexplained sudden death in your family? One should also enquire about fatal accidents such as road traffic accidents and drowning, which might masquerade as SCD.

As many as one in three patients with epilepsy are thought to be misdiagnosed. Many of those will suffer from reflex seizures instead, which can be caused by arrhythmic conditions. Therefore, a question on family history of epilepsy and sudden unexpected death in epilepsy (SUDEP) should be included.[12,13]

5. Examination and simple investigations

Most patients presenting to primary care with palpitations are asymptomatic during the consultation. However, in the rare symptomatic patient the focus is on establishing if the patient is haemodynamically compromised.

In the asymptomatic patient, during the consultation the physical examination is often normal. It is important to assess the pulse rate and rhythm as well as blood pressure. Signs of heart failure, abnormal heart sounds and murmurs point towards structural heart disease. Occasionally, features of thyrotoxicosis and anaemia can be elicited.

Blood tests, which should include full blood count, thyroid function and electrolytes, are essential to exclude anaemia, thyroid dysfunction and electrolyte disturbance.

The 12-lead electrocardiogram (ECG) is most important and can be of more help than a 24-hour ECG. It is surprising how many patients get referred without a 12-lead ECG being carried out but who have had a Holter recording.

The 12-lead ECG can give valuable clues about structural heart disease, such as previous myocardial infarction (MI) or left ventricular hypertrophy. Conduction and repolarisation abnormalities can also point the clinician towards arrhythmia. Occasionally, complete heart block or second-degree AV block might be found, which is an indication for urgent hospital referral.

It is important to add that some significant ECG abnormalities are rather subtle. There have been concerns raised about standards of ECG interpretation skills in general practice,[14] which has led to an ongoing clinical governance review. Ideally, every practice that performs ECGs should have at least one clinician with enhanced interpretation skills or the necessary expertise should be procured elsewhere.

ECG abnormalities to look for:

- Atrial fibrillation
- Second- and third-degree AV block
- Signs of previous myocardial infarction
- Left ventricular hypertrophy and left ventricular strain patterns
- Left bundle branch block
- Abnormal T-wave inversion and ST-segment changes
- Signs of pre-excitation (short PR interval and delta waves)
- Abnormal QTc interval and T-wave morphology

6. Risk stratification

Having completed steps 1 to 5, risk stratification is now possible. As already mentioned, the majority of patients with palpitations either do not have an arrhythmia or the arrhythmia is clinically insignificant. Risk stratification should help to identify the patient cohort among palpitation sufferers who are more likely to have a significant arrhythmia and need to be investigated carefully.

First, patients who are known to have structural heart disease, such as previous MI, heart failure, cardiomyopathy, congenital heart disease and valve disease, clearly need further investigations.[15] This also applies to patients with features in their history suggesting an arrhythmia or significant associated symptoms.

Red flags in the history are palpitations during exertion or palpitations with associated syncope or pre-syncope.

Second, patients who are found to have significant ECG abnormalities need careful evaluation. Although a normal resting ECG does not exclude significant arrhythmias it makes a life-threatening arrhythmia very unlikely.

Third, patients with a family history of sudden cardiac death or with a first-degree relative affected by an inheritable heart condition should be considered red flags and require referral.

Dr Michael Cooklin has raised awareness for risk stratification in arrhythmic illness with 'the traffic light system'. We have modified this (see below) to apply specifically for palpitations.

Low risk: manage in Primary Care	Refer to cardiology / arrhythmia care co-ordinator	Refer to cardiology with urgency
• Skipped beats • Thumping beats • Short fluttering • Slow pounding AND • Normal ECG AND • No family history AND • No structural heart disease	• History suggests recurrent tachyarrhythmia • Palpitations with associated symptoms AND / OR • Abnormal ECG AND / OR • Structural heart disease	• Palpitation during exercise • Palpitations with syncope / near syncope • High risk structural heart disease • Family history of inheritable heart disease / SADS • High degree atrioventricular block

7. Ambulatory rhythm monitoring

Some practices offer ambulatory rhythm monitoring and considerably more have open access to it via intermediate or secondary care services. This can have a positive effect on referral patterns and reduce referral rates,[17] but requires expertise in device selection and interpretation of results.

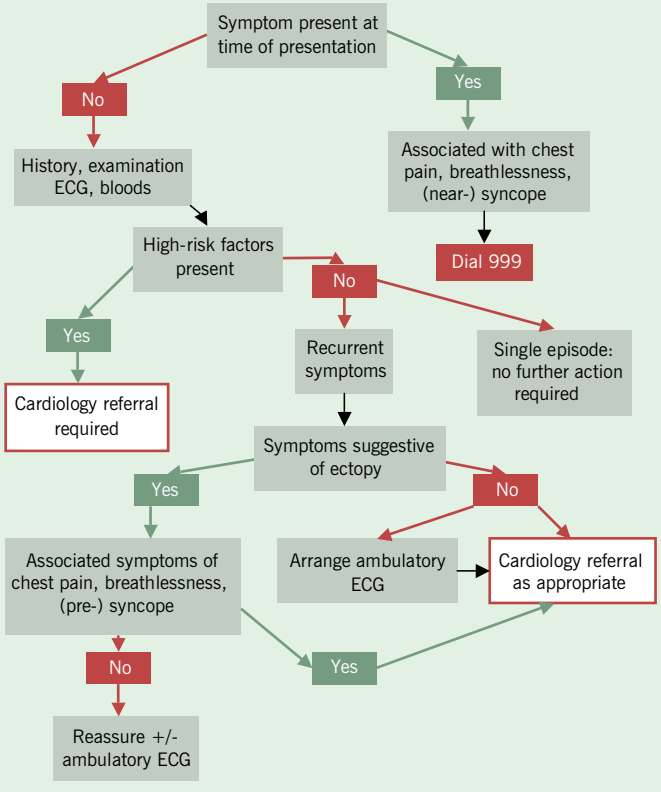
It is important to stress that not all patients with palpitations need ambulatory rhythm monitoring (ARM). Patients with symptoms strongly suggestive of ectopy and without additional risk factors do not necessarily require ARM. On the other hand, investigations in patients with red flags should be left to the cardiologist and ARM in primary care should not delay referral.

The aim is to correlate the patient's symptoms with an ECG trace.[18] The recording period, therefore, needs to match the symptom frequency. Twenty-four-hour recordings are often not long enough to capture patient's symptoms, and hence, the diagnostic yield is very low.[19] As a rule of thumb, patients need to experience symptoms at least three-to-four times per week to make 24-hour ARM a sensible choice. A recording of a symptom-free period is of limited value and can easily lead to false reassurance. For infrequent symptoms, a loop-recording system is a better choice as it allows longer recording periods and can be patient activated.

8. Who to refer to

With the advent of 'choose and book' the referral process has become more complex, but now also offers the opportunity to speed up the patient's journey by advising the patient of the most appropriate provider. In many trusts, arrhythmia care coordinators are available to discuss referrals and help signpost patients.

In some areas there are community cardiology clinics available, either staffed by GPs with a special interest or specialist nurses, who will take referrals for certain conditions, such as atrial fibrillation, and provide diagnostic services. This helps to bring care closer to patients and provides a valuable link between primary and secondary care services. Some conditions benefit from a direct referral to a regional centre specialising in heart rhythm disorders. These units are staffed by consultant electrophysiologists who can perform electrophysiological studies, ablative procedures and carry out complex device therapy. Patients who suffer from atrial flutter or accessory pathways, such as Wolff-Parkinson-White syndrome, will most likely require ablative procedures that cannot be provided in secondary care. Direct referral will reduce the time to treatment and provide a better and more cost-effective service to patients. Another example, which requires a different care pathway, is SCD under the age of 40. In these rare circumstances, first-degree relatives require screening. A referral should not be sent to secondary care but to an inherited cardiac conditions clinic with the appropriate expertise from a multi-disciplinary team, which includes geneticists.



9. Patient support

Suffering from palpitations often causes considerable distress to patients. Tailoring the amount of information to the patient's need can be difficult, and questions on their condition might arise later. Therefore, it is helpful to supply the patient with written information on their respective condition. Arrhythmia nurses can further support patients, but unfortunately primary care rarely has direct access to their skills and expertise for this purpose.

Fortunately, the field of cardiac arrhythmias is blessed with a number of excellent charities, of which primary care does not make use of enough. These charities offer a wide range of services including patient support groups and help lines. They also have very good websites where patients can find valuable information material, which is endorsed by experts and the Department of Health. Furthermore, these websites support clinicians with a wealth of resources that many have found helpful.

Arrhythmia Alliance: www.heartrhythmcharity.org.uk/

Atrial Fibrillation Association: www.atrialfibrillation.org.uk/

Sudden Adult Death Trust: www.sadsuk.org/

Cardiac Risk in the Young: www.c-r-y.org.uk/

10. Occupational and driving advice

Arrhythmias impact on patient's lives in many ways and driving is a particularly important aspect.[20] The Driver and Vehicle Licensing Agency (DVLA) regulations state that if an arrhythmia has caused incapacity or is likely to cause incapacity, driving must cease (full details can be found at: www.dvla.gov.uk/medical/ataglance.aspx). It is the clinician's responsibility to make the patient aware and documentation is often incomplete. Only a small number of patients suffering from palpitations will have a cardiac dysrhythmia that disqualifies them from driving. More relevant to general practice is the group of patients referred for further investigations and a diagnosis is not apparent. Patients with disabling accompanying symptoms should be advised not to drive in these circumstances while awaiting specialist assessment. However, many patients ignore the driving advice given by their physicians. Fortunately, the number of road traffic accidents caused by medical conditions is small (less than 1% of all accidents) and the rate of accidents in even serious but treated arrhythmias does not appear to be in excess of the general population.[21]

The patient's occupation might also be affected. Working at height or with potentially dangerous machinery are only two examples and common sense advice is required.

Conflict of interest

None declared.

References

1. Hannay JR. Symptom prevalence in the community. *J R Coll Gen Pract* 1978;**28**(193):492–9.

2. Gordon J, Vincent R, Bowskill R. The patient's experience of heart palpitations and the cardiology consultation: an exploratory study. *Br J Cardiol* 2008;**15**:249–52.

3. Knudson MP. The natural history of palpitations in a family practice. *J Fam Pract* 1987;**24**:357–60.

4. Mayou R, Sprigings D, Birkhead J, Price J. Characteristics of patients presenting to a cardiac clinic with palpitations. *Q J Med* 2003;**96**:115–23.

5. Weber BE, Kapoora WN. Evaluation and outcomes of patients with palpitations. *Am J Med* 1996;**100**:138–48.

6. Department of Health. *National Service Framework for Coronary Heart Disease: Chapter eight – arrhythmias and sudden cardiac death*. Available from: http://www.dh.gov.uk/en/Healthcare/NationalServiceFrameworks/Coronaryheartdisease/DH_4117048

7. Summerton N, Mann S, Rigby A, Petkar S, Dhawan J. New-onset palpitations in general practice: assessing the discriminant value of items within the clinical history. *Fam Pract* 2001;**18**:383–92.

8. Wen ZC, Chen SA, Tai CT, Chiang CE, Chiou CW, Chang MS. Electrophysiological mechanisms and determinants of vagal maneuvers for termination of paroxysmal supraventricular tachycardia. *Circulation* 1998;**98**:2716–23.

9. Barsky AJ. Palpitations, arrhythmias and awareness of cardiac activity. *Ann Intern Med* 2001;**134**:832–7.

10. Hansson A, Madson-Härdig B, Olsson SB. Arrhythmia provoking factors and symptoms at the onset of paroxysmal atrial fibrillation. *Heart Views* 2004;**5**:40–6.

11. Behr ER, Casey A, Sheppard M *et al*. Sudden arrhythmic death syndrome: a national survey of sudden unexplained cardiac death. *Heart* 2007;**93**:601–05.

12. Mameli O, Melis F, Giraudu D *et al*. The brainstem cardioarrhythmogenic triggers and their possible role is sudden epileptic death. *Epilepsy Res* 1993;**15**:171–8.

13. Ballardie FW, Murphy RP, Davis J. Epilepsy: a presentation of the Romano Ward syndrome. *BMJ* 1983;**24**:896–7.

14. Mant J, Fitzmaurice DA, Hobbs FDR *et al*. Accuracy of diagnosing atrial fibrillation on electrocardiogram by primary care practitioners and interpretative diagnostic software: analysis of data from screening for atrial fibrillation in the elderly (SAFE) trial. *BMJ* 2007;**335**:380–6.

15. Kapoor WN, Hanusa B. Is syncope a risk factor for poor outcomes? Comparison of patients with and without syncope. *Am J Med* 1996;**100**:646–55.

16. Cooklin M, on behalf of the South-East London cardiac network. Traffic light system. Available from: http://www.selcardiacnetwork.nhs.uk/files/Traffic%Lights%20FINAL Jan07.pdf

17. Standing P, Dent M, Craig A, Glenville B. Changes in referral patterns to cardiac outpatient clinics with ambulatory ECG monitoring in general practice. *Br J Cardiol* 2001;**8**:394–8.

18. Zimetbaum PJ, Josephson ME. The evolving role of ambulatory arrhythmia monitoring in general clinical practice. *Ann Intern Med* 1999;**130**:848–56.

19. Reiffel JA, Schwarzberg R, Murry M. Comparison of autotriggered memory loop recorders versus standard loop recorders versus 24-hour Holter monitors for arrhythmia detection. *Am J Cardiol* 2005;**95**:1055–9.

20. Binns H, Camm J. Driving and arrhythmias. *BMJ* 2002;**324**:927–8.

21. Akiyama T, Powell JL, Mitchell LB *et al*. Resumption of driving after life-threatening ventricular tachyarrhythmia. *N Engl J Med* 2001;**345**:391–7.