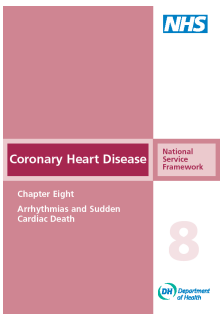
Palpitations

Prof Diana Gorog

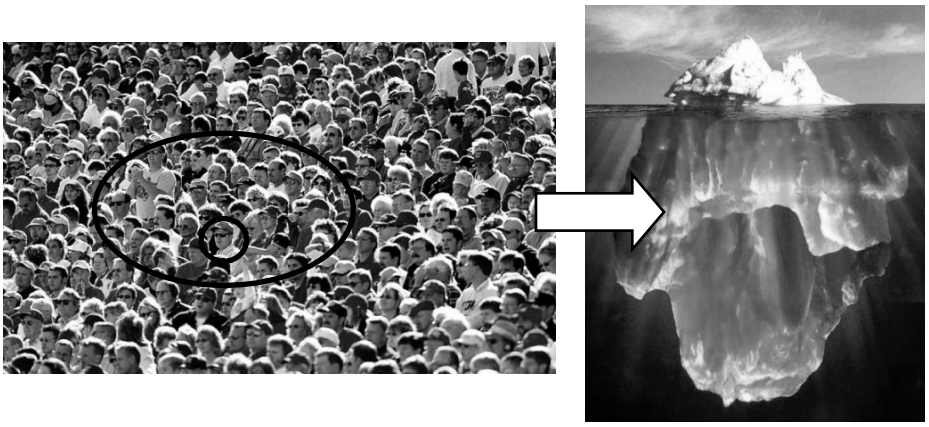
Clinical Director for Cardiology
Consultant Interventional Cardiologist

Arrhythmia from a GP Perspective

- Common presentation
- Significant social impact
- Often benign cause
- Associated with considerable morbidity
- Nevertheless potentially lethal
- Chapter 8 of NSF for CHD



Which patient do I refer?



Arrhythmia from a Patient Perspective

- "I know something's wrong but nobody takes me seriously"
- "My heart keeps missing beats (and I am really worried I am going to die)"
- Less than 10% of patients will have a significant arrhythmia

4

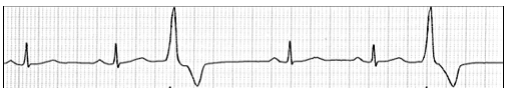
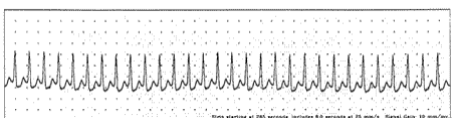
Palpitation

- Def.: An (unpleasant) awareness of forceful, irregular, or rapid beating of the heart.

  - Instantaneous or transient vs. sustained
  - Irregular vs. regular
  - Sudden vs. gradual onset and termination

Palpitations: History

Symptoms:

- "flip-flopping in chest" – isolated PACs or PVCs 
- "missed" beats
- "rapid fluttering in chest" – atrial or ventricular arrhythmias
- "pounding in the neck" – AV node reentrant tachycardia 

Palpitations: History

Mode of Onset:

- Abrupt suggests paroxysmal abnormal tachycardia, though sinus tach may start abruptly in anxiety.

Mode of Termination:

- Abrupt suggests paroxysmal arrhythmia, though high adrenergic tone caused by arrhythmia may result in consequent sinus tach.

Palpitations: History

Characteristics:

- Rapid, irregular – AF, AFL, Atrial tachycardia, multiple PACs or PVCs
- Rapid, regular – SVT, VT

Circumstances:

- Panic/anxiety – the chicken or the egg?
- Catecholamine excess
  - Exercise – idiopathic RVOT VT, AF
  - Emotional startle – Long QT syndrome

Precipitants

- Caffeine
- Alcohol
- Hormonal changes
  - Pregnancy
  - Menopause
- Exercise

How should I assess someone who has palpitations?

- **Assess symptoms suggesting a serious complication** from an arrhythmia including:
  - Breathlessness
  - Chest pain
  - Syncope or dizziness
- **Check blood pressure**
- **Assess risk of serious arrhythmia**:
  - Family history of premature sudden cardiac death
  - Personal history of myocardial infarction or cardiomyopathy
- **Take an ECG** including a long rhythm strip .
- **If there is uncertainty about excluding VT or compromising paroxysmal SVT seek help urgently.** Consider:
  - Faxing the ECG for immediate secondary care interpretation, *or*
  - Emergency admission, ensuring the ECG is included with the letter of referral.

When are palpitations likely to be an arrhythmia?

High Positive predictive Value of :

- Symptoms assoc. with syncope
- Symptoms during exercise
- Symptoms disturbing sleep
- Regular palpitations

High Pre test odds or red flags:

- Known Structural heart disease
- Family history SCD
- Personal Hx Syncope
- Male
- Increased age

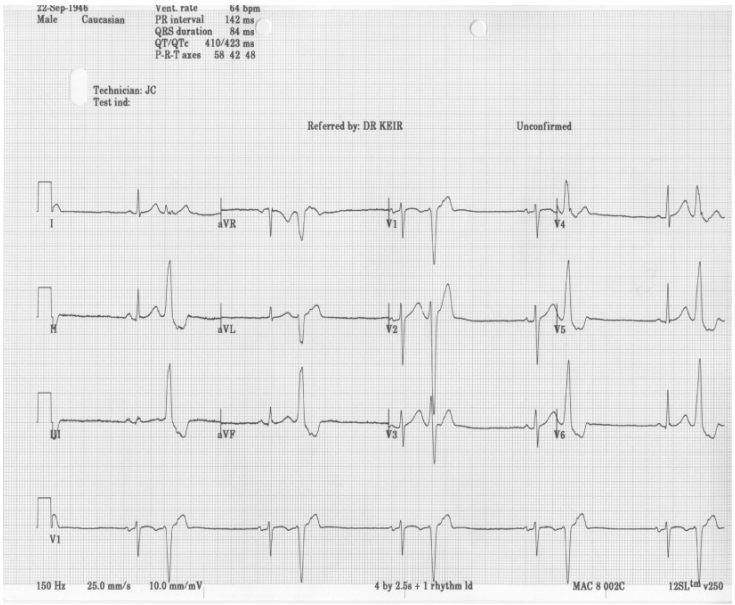
11

Palpitations: Workup

- Good history (inc. past medical & FH)
- Check FBC, U&E and thyroid function
- 12 lead ECG
- 24 hour Holter monitor
- Ambulatory ECG
  - Continuous loop event recorder
  - Event recorders with auto-activation (features of both Holter and event recorder) (e.g. Novacor)
- Echocardiogram
- Treadmill test (for sxs with or after exercise)
- Implantable loop recorder
- E.P. testing

Palpitations: Workup

- Good history (inc. past medical & FH)
- Check FBC, U&E and thyroid function
- 12 lead ECG
- 24 hour Holter monitor
- Ambulatory ECG
  - Continuous loop event recorder
  - Event recorders with auto-activation (features of both Holter and event recorder) (e.g. Novacor)
- Echocardiogram
- Treadmill test (for sxs with or after exercise)
- Implantable loop recorder
- E.P. testing

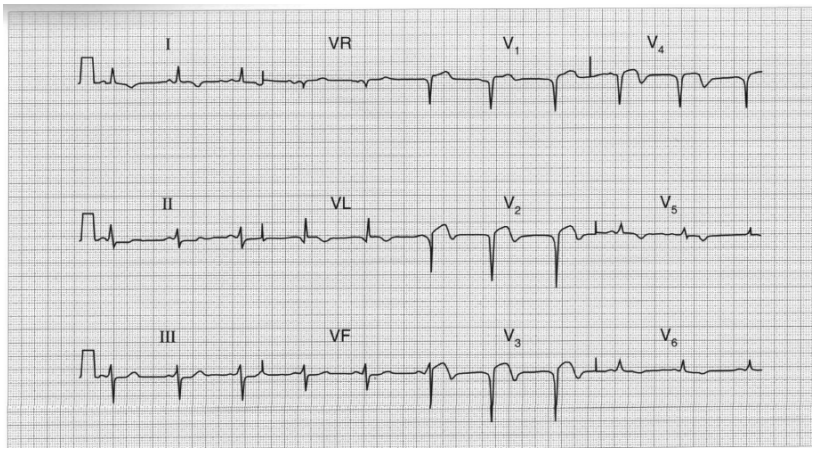


Sinus rhythm ECG

- May be:
  - Indicative of need for further investigations
    - Non-specific changes (e.g. TW inversion, LVH)
  - Prognostic
    - Prior MI, HCM
  - Diagnostic
    - WPW, LQTS, Brugada
    - (rarely delayed potentials or epsilon waves in ARVC)

Characteristic ECG abnormalities associated with increased risk of/with arrhythmia:

- **Evidence of an old myocardial infarction.** Example ECG.
  - Pathological Q waves
  - Inversion of T waves
  - Loss of R wave progression across the chest leads following an anterior MI.
- **Left ventricular hypertrophy.** Example ECG.
  - R wave in V6 greater than 25 mm.
  - R wave in V6 plus S wave in V1 greater than 35 mm
  - Inverted T wave in V1, VL, V5 – V6.
  - Axis normal or deviated to the left.
- **Right ventricular hypertrophy.** Example ECG.
  - Tall R wave in V1.
  - T wave inversion in V1 – V3 or V4.
  - Deep S wave in V6.
  - Right axis deviation.

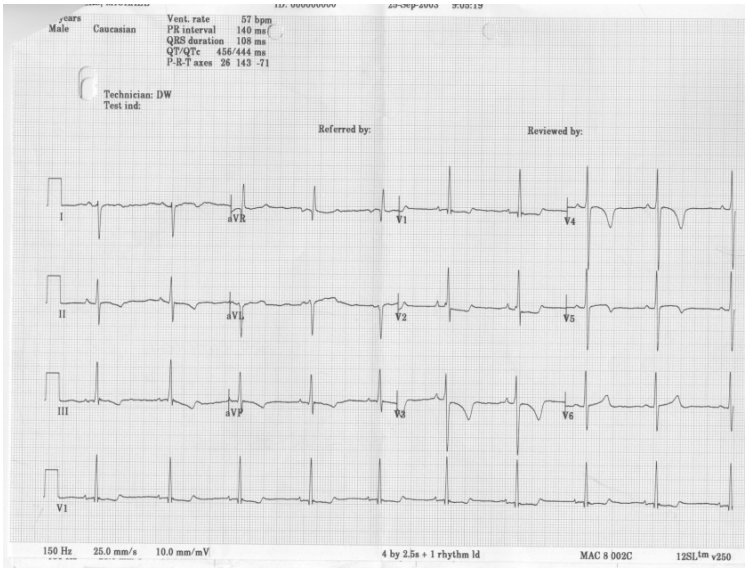


Characteristic ECG abnormalities associated with increased risk of/with arrhythmia:

- **Evidence of an old myocardial infarction.** Example ECG.
  - Pathological Q waves
  - Inversion of T waves
  - Loss of R wave progression across the chest leads following an anterior MI.
- **Left ventricular hypertrophy.** Example ECG.
  - R wave in V6 greater than 25 mm.
  - R wave in V6 plus S wave in V1 greater than 35 mm
  - Inverted T wave in V1, VL, V5 – V6.
  - Axis normal or deviated to the left.
- **Right ventricular hypertrophy.** Example ECG.
  - Tall R wave in V1.
  - T wave inversion in V1 – V3 or V4.
  - Deep S wave in V6.
  - Right axis deviation.

Characteristic ECG abnormalities associated with increased risk of/with arrhythmia:

- **Evidence of an old myocardial infarction.** Example ECG.
  - Pathological Q waves
  - Inversion of T waves
  - Loss of R wave progression across the chest leads following an anterior MI.
- **Left ventricular hypertrophy.** Example ECG.
  - R wave in V6 greater than 25 mm.
  - R wave in V6 plus S wave in V1 greater than 35 mm
  - Inverted T wave in V1, VL, V5 – V6.
  - Axis normal or deviated to the left.
- **Right ventricular hypertrophy.** Example ECG.
  - Tall R wave in V1.
  - T wave inversion in V1 – V3 or V4.
  - Deep S wave in V6.
  - Right axis deviation.

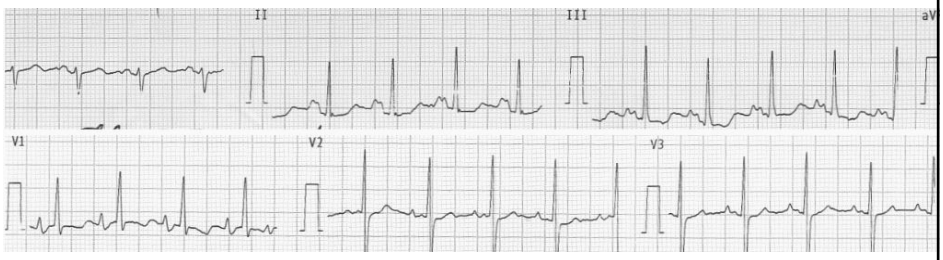


Characteristic ECG abnormalities associated with increased risk of/with arrhythmia:

- **P wave abnormalities.**
  - Peaked P waves occur with right atrial hypertrophy caused by tricuspid valve stenosis or pulmonary hypertension. Example ECG.
  - Broad and bifid P waves occur with left atrial hypertrophy usually caused by mitral stenosis.

- **Evidence of Wolff–Parkinson–White syndrome.** Example ECG.
  - Short PR interval.
  - Slight widening of the QRS: delta wave with normal terminal QRS segment.
  - Dominant R wave in V1.
  - Inverted T waves in V1 – V4.

- **Prolonged QT** Example ECG.
  - Calculate the corrected QT (QTc) by dividing the QT/√R-R interval.
  - Normal <0.45

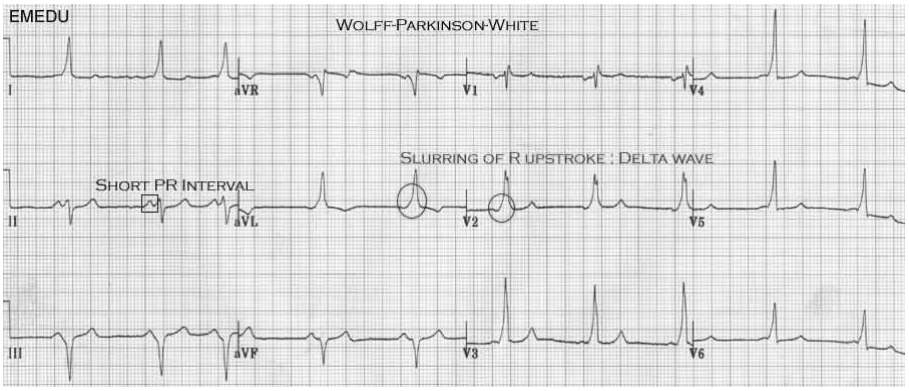


Characteristic ECG abnormalities associated with increased risk of/with arrhythmia:

- **P wave abnormalities.**
  - Peaked P waves occur with right atrial hypertrophy caused by tricuspid valve stenosis or pulmonary hypertension. Example ECG.
  - Broad and bifid P waves occur with left atrial hypertrophy usually caused by mitral stenosis.
- **Evidence of Wolff–Parkinson–White syndrome.** Example ECG.
  - Short PR interval.
  - Slight widening of the QRS: delta wave with normal terminal QRS segment.
  - Dominant R wave in V1.
  - Inverted T waves in V1 – V4.
- **Prolonged QT** Example ECG.
  - Calculate the corrected QT (QTc) by dividing the QT/√R-R interval.
  - Normal <0.45

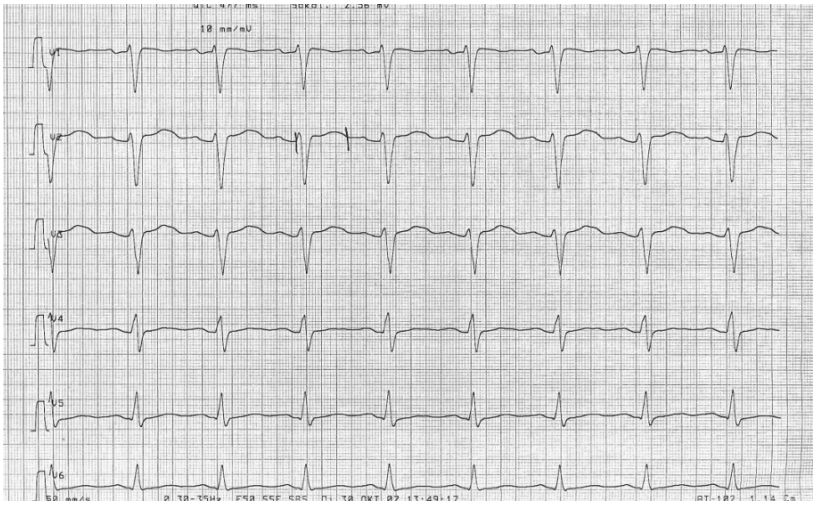
WPW

- URGENT referral



Characteristic ECG abnormalities associated with increased risk of/with arrhythmia:

- **P wave abnormalities.**
  - Peaked P waves occur with right atrial hypertrophy caused by tricuspid valve stenosis or pulmonary hypertension. Example ECG.
  - Broad and bifid P waves occur with left atrial hypertrophy usually caused by mitral stenosis.
- **Evidence of Wolff–Parkinson–White syndrome.** Example ECG.
  - Short PR interval.
  - Slight widening of the QRS: delta wave with normal terminal QRS segment.
  - Dominant R wave in V1.
  - Inverted T waves in V1 – V4.
- **Prolonged QT** Example ECG.
  - Calculate the corrected QT (QTc) by dividing the QT/√R-R interval.
  - Normal <0.45



Palpitations: Workup

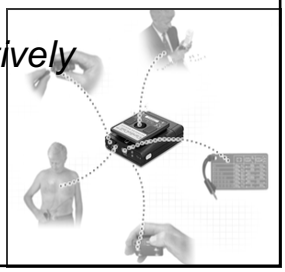
- Good history (inc. past medical & FH)
- Check FBC, U&E and thyroid function
- 12 lead ECG
- 24 hour Holter monitor
- Ambulatory ECG
  - Continuous loop event recorder
  - Event recorders with auto-activation (features of both Holter and event recorder) (e.g. Novacor)
- Echocardiogram
- Treadmill test (for sxs with or after exercise)
- Implantable loop recorder
- E.P. testing

Ambulatory ECG recording

- Holter monitoring
  - 24, 48hr, 7 day tapes
  - Continuous recording
  - Patient provides event diary
  - Clinically reported events *and* asymptomatic episodes examined
  - Low yield

Ambulatory ECG recording

- Event recording
  - Patient connected to continuous recorder
    - "loop" recorder records continuously but also erases data if not activated
    - Patient can activate recorder and thus record *retrospectively and prospectively*
  - Patient connects recorder when symptomatic and records *prospectively only*



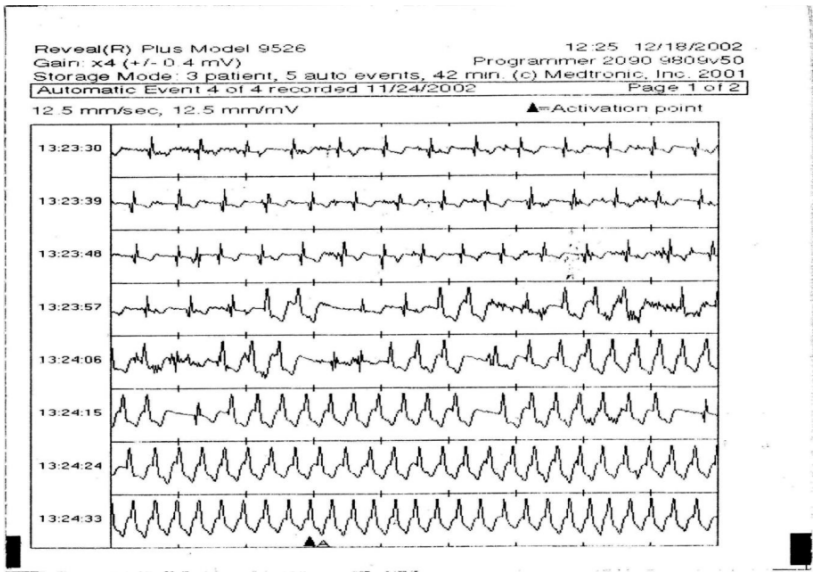
Ambulatory ECG recording

- Event recording with automatic arrhythmia detection
  - Combines advantages of Holter monitoring and event recording
  - Both *patient* and *device* can trigger a recording if symptoms or an arrhythmia are suspected respectively

Implantable loop recorders

- Combined arrhythmia detection and patient activation
- Up to 3 years battery longevity
- Device can be interrogated and data downloaded multiple times

"Reveal" interrogation

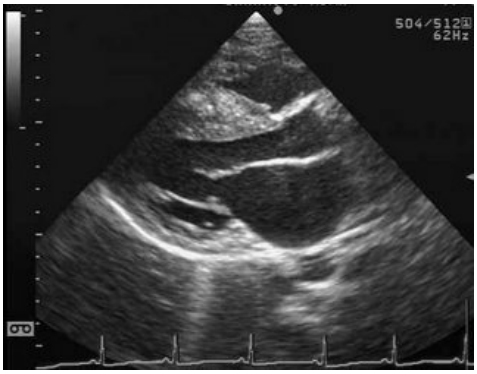


Exercise test

Predominantly for exertional symptoms

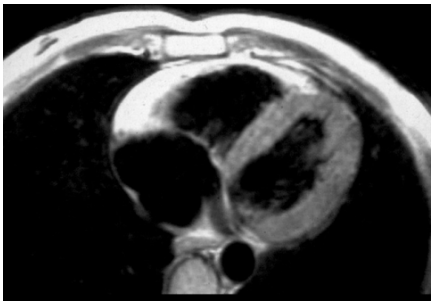
Echo

- LV dysfunction
  - Scar
  - Ischaemic
  - other
- LVH
- Valvular disease
- Cardiomyopathy
  - HCM
  - Dilated
  - arrhythmogenic



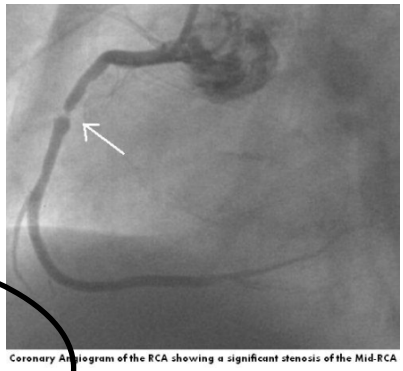
MRI

- If
  - Malignant arrhythmia of unknown cause
  - Frequent RVOT ectopy suggestive of runs
  - Relevant FHx SCD
- Scar (small)
- Features of ARVC
- Sarcoid
- Amyloid
- HCM



Coronary Angiogram

- Assessment of VT
  - More often scar
  - Ischemia may be important in 30% cases

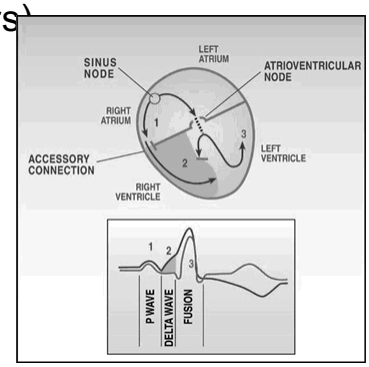

Coronary Angiogram of the RCA showing a significant stenosis of the Mid-RCA

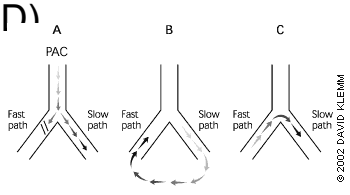
VT ⇨ **scar**

VF ⇨ **ischaemia**

Palpitations: Management

- Reassurance
- Beta blockers (or Ca blockers)
- Antiarrhythmic therapy
- Catheter ablation
- (ICD)





In summary

- Good history is ESSENTIAL
- Remember red flag signs!
- Investigate only those that need it
- Investigate these with most appropriate tests
- If high index of suspicion, keep testing!

References

- 1 Arrhythmia & Sudden Cardiac Death Subgroup (2007) *Recommended protocol for palpitations.* Thames Valley Cardiac Network. www.oxfordradcliffe.nhs.uk [Accessed: 15/10/2008]. [Free Full-text]
- 2 Camm, A.J. and Bunce, N.H. (2005) Cardiovascular disease. In: Kumar, P. and Clark, M. (Eds.) *Kumar & Clark Clinical Medicine*. 6th edn. London: Elsevier Saunders. 725-871.
- 3 DH (2005) *National service framework for coronary heart disease. Chapter eight: arrhythmias and sudden cardiac death.* Department of Health. www.dh.gov.uk [Accessed: 15/03/2005]. [Free Full-text]
- 4 Hampton, J.R. (2008) *The ECG made easy.* 7th edn. Edinburgh: Churchill Livingstone.
- 5 Hampton, J.R. (2008) *The ECG in practice.* 5th edn. Edinburgh: Churchill Livingstone.
- 6 RCGP (2008) Palpitations and arrhythmia. *InnovAiT* **1**(1), 25-34.