



## Complete Summary

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### GUIDELINE TITLE

Cardiac arrhythmias in coronary heart disease. A national clinical guideline.

### BIBLIOGRAPHIC SOURCE(S)

Scottish Intercollegiate Guidelines Network (SIGN). Cardiac arrhythmias in coronary heart disease. A national clinical guideline. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network (SIGN); 2007 Feb. 40 p. (SIGN publication; no. 94). [198 references]

### GUIDELINE STATUS

This is the current release of the guideline.

Any amendments to the guideline in the interim period will be noted on [Scottish Intercollegiate Guidelines Network \(SIGN\) Web site](#).

## COMPLETE SUMMARY CONTENT

SCOPE  
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## SCOPE

### DISEASE/CONDITION(S)

Cardiac arrhythmias in coronary heart disease

**Note:** This guideline excludes arrhythmias not associated with coronary heart disease such as supraventricular tachycardias associated with accessory pathways or dual atrioventricular (AV) nodal physiology, arrhythmias caused by inherited ion channel disorders (e.g., long QT syndrome, Brugada syndrome), and arrhythmias associated with non-ischaemic cardiomyopathies.

## **GUIDELINE CATEGORY**

Counseling  
Diagnosis  
Evaluation  
Management  
Prevention  
Risk Assessment  
Treatment

## **CLINICAL SPECIALTY**

Anesthesiology  
Cardiology  
Emergency Medicine  
Family Practice  
Internal Medicine  
Psychology  
Thoracic Surgery

## **INTENDED USERS**

Advanced Practice Nurses  
Allied Health Personnel  
Nurses  
Physician Assistants  
Physicians  
Psychologists/Non-physician Behavioral Health Clinicians

## **GUIDELINE OBJECTIVE(S)**

To provide evidence-based recommendations for the management of cardiac arrest and the arrhythmias associated with acute coronary syndromes, chronic coronary heart disease and cardiac surgery

## **TARGET POPULATION**

Adult patients with cardiac arrhythmias associated with acute coronary syndromes, chronic coronary heart disease and cardiac surgery

## **INTERVENTIONS AND PRACTICES CONSIDERED**

### **Management/Prevention/Treatment**

#### **Arrhythmias Associated with Cardiac Arrest**

1. Risk factor intervention
2. Health promotion measures and encouragement of moderate intensity physical activity
3. Cardiopulmonary resuscitation (CPR) training
4. Prompt defibrillation, including use of automated external defibrillators

5. Adjunctive therapies including adrenaline (epinephrine), amiodarone, procainamide, sotalol, magnesium, potassium, isoprenaline, dopamine, atropine, aminophylline, temporary transcutaneous pacing, or withdrawal of QT-interval-prolonging drugs

### **Arrhythmias Associated with Acute Coronary Syndromes**

1. Synchronized direct current (DC) cardioversion
2. Anti-arrhythmic and rate limiting therapy with intravenous amiodarone, beta-blockade, verapamil, or digoxin
3. Discontinuation of concurrent therapies which predispose to bradycardia in patients with conduction disturbances and bradycardia
4. Initiation of transvenous or transcutaneous temporary pacing or permanent pacing in selected patients
5. Risk assessment and optimisation of therapy for patients with ventricular fibrillation (VF) or VT
6. Treatment of selected patients with myocardial infarction (MI) with eplerenone, as indicated
7. Assessment of left ventricular (LV) function in patients with acute MI

### **Arrhythmias Associated with Chronic Coronary Heart Disease/Left Ventricular Dysfunction**

#### *Atrial Fibrillation*

1. Amiodarone or sotalol treatment for prevention of atrial fibrillation recurrence
2. Rate control with beta-blockers, rate-limiting calcium channel blockers, or digoxin, or a combination of drugs
3. Rate control with ablation and pacing

#### *Ventricular Arrhythmias*

1. Revascularisation
2. Implantable cardioverter defibrillator therapy (ICD)
3. Cardiac resynchronisation therapy + defibrillator (CRT-D)
4. Long term use of beta-blockers
5. Treatment with amiodarone or sotalol in selected patients

### **Arrhythmias Associated with Coronary Artery Bypass Graft Surgery**

1. Assessment of risk for postoperative arrhythmia
2. Pharmacological therapy with amiodarone, beta-blockers, verapamil, diltiazem, magnesium, as indicated
3. Use of glucose-insulin-potassium regimens (not recommended)
4. Use of digoxin prophylaxis (not recommended)
5. Consideration of anesthetic agent or technique
6. Consideration of surgical techniques
7. Synchronised cardioversion for patients with atrial fibrillation
8. Defibrillation for patients with ventricular arrhythmias

### **Psychosocial Assessment, Screening, and Management**

1. Screening for anxiety or depressive disorders
2. Selective cognitive screening
3. Consideration of psychosocial implications
4. Psychosocial interventions

## **MAJOR OUTCOMES CONSIDERED**

- Sudden cardiac death
- Short-term, long-term, and in-hospital mortality
- Survival
- Quality of life
- Recurrence of arrhythmia
- Heart rate control
- Ejection fraction
- Symptomatic and functional status
- Return of spontaneous recirculation
- Restoration of sinus rhythm
- Cost effectiveness
- Psychosocial outcomes, including levels of anxiety and depression

## **METHODOLOGY**

### **METHODS USED TO COLLECT/SELECT EVIDENCE**

Hand-searches of Published Literature (Primary Sources)  
Hand-searches of Published Literature (Secondary Sources)  
Searches of Electronic Databases

### **DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE**

The evidence base for this guideline was synthesised in accordance with Scottish Intercollegiate Guidelines Network (SIGN) methodology. A systematic review of the literature was carried out using a search strategy devised by a SIGN Information Officer. Databases searched include Medline, Embase, Cinahl, PsychINFO, and the Cochrane Library. For most searches, the year range covered was 1999-2005. Internet searches were carried out on various websites including the New Zealand Guidelines Programme, NEL H Guidelines Finder, and the US National Guidelines Clearinghouse. The Medline version of the main search strategies can be found on the SIGN website, in the section covering supplementary guideline material. The main searches were supplemented by material identified by individual members of the development group.

### **NUMBER OF SOURCE DOCUMENTS**

Not stated

### **METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE**

Weighting According to a Rating Scheme (Scheme Given)

## **RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE**

### **Levels of Evidence**

**1++:** High quality meta-analyses, systematic reviews of randomised controlled trials (RCTs), or RCTs with a very low risk of bias

**1+:** Well-conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias

**1-:** Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias

**2++:** High quality systematic reviews of case control or cohort studies  
High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal

**2+:** Well-conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal

**2-:** Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal

**3:** Non-analytic studies (e.g. case reports, case series)

**4:** Expert opinion

## **METHODS USED TO ANALYZE THE EVIDENCE**

Review of Published Meta-Analyses  
Systematic Review with Evidence Tables

## **DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE**

Once papers have been selected as potential sources of evidence, the methodology used in each study is assessed to ensure its validity. The result of this assessment will affect the level of evidence allocated to the paper, which will in turn influence the grade of recommendation that it supports.

The methodological assessment is based on a number of key questions that focus on those aspects of the study design that research has shown to have a significant influence on the validity of the results reported and conclusions drawn. These key questions differ between study types, and a range of checklists is used to bring a degree of consistency to the assessment process. Scottish Intercollegiate Guidelines Network (SIGN) has based its assessments on the MERGE (Method for Evaluating Research and Guideline Evidence) checklists developed by the New South Wales Department of Health, which have been subjected to wide consultation and evaluation. These checklists were subjected to detailed evaluation and adaptation to meet SIGN's requirements for a balance between methodological rigour and practicality of use.

The assessment process inevitably involves a degree of subjective judgment. The extent to which a study meets a particular criterion (e.g., an acceptable level of loss to follow up) and, more importantly, the likely impact of this on the reported results from the study will depend on the clinical context. To minimise any potential bias resulting from this, each study must be evaluated independently by at least two group members. Any differences in assessment should then be discussed by the full group. Where differences cannot be resolved, an independent reviewer or an experienced member of SIGN Executive staff will arbitrate to reach an agreed quality assessment.

### **Evidence Tables**

Evidence tables are compiled by SIGN executive staff based on the quality assessments of individual studies provided by guideline development group members. The tables summarise all the validated studies identified from the systematic literature review relating to each key question. They are presented in a standard format to make it easier to compare results across studies, and will present separately the evidence for each outcome measure used in the published studies. These evidence tables form an essential part of the guideline development record and ensure that the basis of the guideline development group's recommendations is transparent.

Additional details can be found in the companion document titled "SIGN 50: A Guideline Developers' Handbook" (see "Availability of Companion Documents" field in this summary).

## **METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Expert Consensus

### **DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS**

#### **Synthesising the Evidence**

Guideline recommendations are graded to differentiate between those based on strong evidence and those based on weak evidence. This judgment is made on the basis of an (objective) assessment of the design and quality of each study and a (perhaps more subjective) judgment on the consistency, clinical relevance and external validity of the whole body of evidence. The aim is to produce a recommendation that is evidence-based, but which is relevant to the way in which health care is delivered in Scotland and is therefore implementable.

It is important to emphasise that the grading does not relate to the importance of the recommendation, but to the strength of the supporting evidence and, in particular, to the predictive power of the study designs from which that data was obtained. Thus, the grading assigned to a recommendation indicates to users the likelihood that, if that recommendation is implemented, the predicted outcome will be achieved.

#### **Considered Judgment**

It is rare for the evidence to show clearly and unambiguously what course of action should be recommended for any given question. Consequently, it is not always clear to those who were not involved in the decision making process how guideline developers were able to arrive at their recommendations, given the evidence they had to base them on. In order to address this problem, SIGN has introduced the concept of considered judgment.

Under the heading of considered judgment, guideline development groups summarise their view of the total body of evidence covered by each evidence table. This summary view is expected to cover the following aspects:

- Quantity, quality, and consistency of evidence
- Generalisability of study findings
- Directness of application to the target population for the guideline
- Clinical impact (i.e., the extent of the impact on the target patient population, and the resources needed to treat them)
- Implementability (i.e., how practical it would be for the NHS in Scotland to implement the recommendation)

Guideline development groups are provided with a pro forma in which to record the main points from their considered judgment. Once they have considered these issues, the group is asked to summarise their view of the evidence and assign a level of evidence to it, before going on to derive a graded recommendation.

Additional detail about SIGN's process for formulating guideline recommendations is provided in Section 6 of the companion document titled "SIGN 50: A Guideline Developers' Handbook" (see "Availability of Companion Documents" field).

## **RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS**

### **Grades of Recommendation**

*Note: The grade of recommendation relates to the strength of the evidence on which the recommendation is based. It does not reflect the clinical importance of the recommendation.*

**A:** At least one meta-analysis, systematic review of randomized controlled trials (RCTs), or RCT rated as 1++ and directly applicable to the target population; *or*

A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results

**B:** A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; *or*

Extrapolated evidence from studies rated as 1++ or 1+

**C:** A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; *or*

Extrapolated evidence from studies rated as 2++

**D:** Evidence level 3 or 4; *or*

Extrapolated evidence from studies rated as 2+

**Good Practice Points:** Recommended best practice based on the clinical experience of the guideline development group

## **COST ANALYSIS**

### **Cost Effectiveness of Cardiopulmonary Resuscitation (CPR) Training**

Targeted CPR training of lay people selected by occupation, low training costs, or having high-risk household companions is substantially more cost effective than training unselected lay people.

### **Cost Effectiveness of Automated External Defibrillators (AEDs)**

The use of AEDs by trained first responders is cost effective in urban areas and where vehicle response times are minimised within the emergency medical services system. However, the cost effectiveness of public access defibrillators has not been demonstrated. The major factors influencing cost effectiveness are frequency of cardiac arrest, consistent rapid response times by the responders and the cost of the equipment and associated training. No evidence was identified on the clinical or cost effectiveness of AEDs in rural areas.

### **Cost Effectiveness of Implantable Cardioverter Defibrillators (ICDs)**

The evidence on the cost effectiveness of ICDs is weak. Both improved targeting of patients at greatest risk of sudden cardiac death and fewer hospital admissions for maintenance and replacement of devices are likely to be necessary before the cost effectiveness ratios for ICDs relative to medical therapy approach conventional cost effectiveness thresholds.

## **METHOD OF GUIDELINE VALIDATION**

External Peer Review  
Internal Peer Review

## **DESCRIPTION OF METHOD OF GUIDELINE VALIDATION**

The national open meeting is the main consultative phase of Scottish Intercollegiate Guidelines Network (SIGN) guideline development.

### **Peer Review**

All SIGN guidelines are reviewed in draft form by independent expert referees, who are asked to comment primarily on the comprehensiveness and accuracy of interpretation of the evidence base supporting the recommendations in the guideline. A number of general practitioners (GPs) and other primary care practitioners also provide comments on the guideline from the primary care perspective, concentrating particularly on the clarity of the recommendations and

their assessment of the usefulness of the guideline as a working tool for the primary care team. The draft is also sent to a lay reviewer in order to obtain comments from the patient's perspective. The comments received from peer reviewers and others are carefully tabulated and discussed with the chairman and with the guideline development group. Each point must be addressed and any changes to the guideline as a result noted or, if no change is made, the reasons for this recorded.

As a final quality control check prior to publication, the guideline and the summary of peer reviewers' comments are reviewed by the SIGN Editorial Group for that guideline to ensure that each point has been addressed adequately and that any risk of bias in the guideline development process as a whole has been minimised. Each member of the guideline development group is then asked formally to approve the final guideline for publication.

## RECOMMENDATIONS

### MAJOR RECOMMENDATIONS

**Note from the Scottish Intercollegiate Guidelines Network (SIGN) and National Guideline Clearinghouse (NGC):** *In addition to these evidence-based recommendations, the guideline development group also identifies points of best clinical practice in the full-text guideline document.*

The grades of recommendations (A–D) and levels of evidence (1++, 1+, 1-, 2++, 2+, 2-, 3, 4) are defined at the end of the "Major Recommendations" field.

#### **Arrhythmias Associated with Cardiac Arrest**

##### **Primary Prevention of Sudden Cardiac Death**

**D** - Efforts to prevent sudden cardiac death should include:

- Risk factor intervention in those individuals who are at high risk for coronary heart disease
- Health promotion measures and encouragement of moderate intensity physical activity in the general population.

##### **Bystander Cardiopulmonary Resuscitation (CPR)**

**C** - The number of lay people trained to initiate CPR in out-of-hospital cardiac arrest should be increased.

**D** - Lay people identified as having a high probability of witnessing a cardiac arrest should be offered CPR training

**D** - CPR should be taught as part of the school curriculum.

##### **Defibrillation**

**B** - Defibrillation in patients with ventricular fibrillation (VF) or pulseless ventricular tachycardia (VT) should be administered without delay for witnessed cardiac arrests and immediately following two minutes of CPR for unwitnessed out-of-hospital cardiac arrests.

**C** - Prompt defibrillation should be available throughout all healthcare facilities.

**C** - All healthcare workers trained in CPR should also be trained, equipped, authorised and encouraged to perform defibrillation.

**A** - Automated external defibrillators should be used by trained first responders, with their use integrated within the emergency medical services system.

**B** - Automated external defibrillators should be sited in locations which have a high probability of a cardiac arrest event.

### **Adjunctive Therapies in the Peri-Arrest Period**

**D** - Intravenous adrenaline/epinephrine should be used for the management of patients with refractory ventricular tachycardia/ventricular fibrillation (VT/VF).

**A** - Intravenous amiodarone should be considered for the management of refractory VT/VF.

**D** - Intravenous amiodarone, procainamide or sotalol should be used in the management of patients with haemodynamically stable VT.

**D** - Patients with polymorphic VT should be treated with intravenous magnesium. QT interval prolonging drugs, if prescribed, should be withdrawn. If present, hypokalaemia should be corrected by potassium infusion and bradycardia by temporary pacing or isoprenaline infusion.

**D** - Patients with cardiac arrest secondary to asystole or pulseless electrical activity should receive intravenous adrenaline/epinephrine.

**C** - Atropine should be used in the treatment of patients with symptomatic bradycardia.

**D** - Temporary transcutaneous pacing should be initiated quickly in patients not responding to atropine.

**D** - When atropine or transcutaneous pacing is ineffective consider adrenaline/epinephrine, dopamine, isoprenaline or aminophylline infusions before transvenous pacing is instituted.

### **Arrhythmias Associated with Acute Coronary Syndromes**

#### **Atrial Fibrillation (AF)**

**B** - Class 1C anti-arrhythmic drugs should not be used in patients with AF in the setting of acute myocardial infarction (MI).

**D** - Patients with AF and haemodynamic compromise should have urgent synchronised direct current (DC) cardioversion or be considered for anti-arrhythmic and rate-limiting therapy using:

- Intravenous amiodarone

or

- Digoxin, particularly in presence of severe left ventricular (LV) systolic dysfunction with heart failure.

**D** - Patients with AF with a rapid ventricular response, without haemodynamic compromise but with continuing ischaemia should be treated with one of:

- Intravenous beta-blockade, in the absence of contraindications
- Intravenous verapamil where there are contraindications to beta blockade and there is no LV systolic dysfunction
- Synchronised DC cardioversion

**D** - Patients with AF without haemodynamic compromise or ischaemia should be treated with rate-limiting therapy, preferably a beta-blocker, and be considered for chemical cardioversion with amiodarone or DC cardioversion.

### **Conduction Disturbances and Bradycardia**

**D** - In patients with symptomatic bradycardia/conduction disturbance, concurrent therapies which predispose to bradycardia (*e.g., beta-blockers, digoxin, verapamil*) should be discontinued.

**D** - Isolated first degree heart block/Mobitz type I second degree heart block require no treatment.

**D** - Transvenous temporary pacing should be considered for patients with:

- Sinus bradycardia (*heart rate <40 beats per minute*) associated with symptoms and unresponsive to atropine
- Alternating left and right bundle branch block
- Mobitz type II atrioventricular (AV) block with new bundle branch block
- Third degree AV block in inferior MI, if unresponsive to atropine and haemodynamically compromised, and in all cases of anterior MI
- Ventricular standstill

Transcutaneous pacing should be available to all patients with other atrioventricular and intraventricular conduction disturbances.

**D** - Permanent pacing is indicated for patients with persistent Mobitz type II second degree block, or persistent third degree AV block.

**D** - Permanent pacing should be considered for patients who have had transient second degree or third degree AV block with associated bundle branch block.

### **Ventricular Arrhythmias**

**C** - Patients who have primary VF should be recognised as being at increased risk during their hospital stay, and medical therapy should be optimised.

**D** - Patients who have monomorphic VT following acute MI, or VF greater than 48 hours after infarction, should be recognised as being at increased short and long term risk and should be considered for revascularisation and implantable cardioverter defibrillator (ICD).

**A** - Routine use of anti-arrhythmic drugs is not recommended following MI.

**B** - Patients who have suffered a recent myocardial infarction and with left ventricular ejection fraction (LVEF)  $\leq 0.40$  and either diabetes or clinical signs of heart failure should receive eplerenone unless contraindicated by the presence of renal impairment or high potassium levels.

**C** - LV function should be assessed in all patients with acute MI during the index admission.

**C** - Non-invasive assessment of the risk of ventricular arrhythmias may be considered but is not routinely recommended.

**C** - Invasive electrophysiological studies are not routinely recommended for all patients post-MI.

### **Arrhythmias Associated with Chronic Coronary Heart Disease/Left Ventricular Dysfunction**

#### **Atrial Fibrillation**

**A** - Amiodarone or sotalol treatment should be considered where prevention of atrial fibrillation recurrence is required on symptomatic grounds.

**A** - Rate control is the recommended strategy for management of patients with well tolerated atrial fibrillation.

**A** - Ventricular rate in AF should be controlled with beta blockers, rate-limiting calcium channel blockers (*verapamil or diltiazem*), or digoxin.

**C** - Digoxin does not control rate effectively during exercise and should be used as first line therapy only in people who are sedentary, or in overt heart failure.

**C** - In some people a combination of drugs may be required to control heart rate in atrial fibrillation. Options include the addition of digoxin to either a beta blocker or a rate limiting calcium channel blocker.

**B** - Ablation and pacing should be considered for patients with AF who remain severely symptomatic or have LV dysfunction in association with poor rate control or intolerance to rate control medication.

### **Ventricular Arrhythmias**

**C** - Revascularisation should be considered in patients who have had sustained VT or VF.

**A** - Patients with moderate to severe LV dysfunction (e.g., ejection fraction <0.35), in New York Heart Association (NYHA) class I-III at least one month after myocardial infarction should be considered for ICD therapy.

**B** - Patients with spontaneous non-sustained ventricular tachycardia (*especially if sustained ventricular tachycardia is inducible*), severely impaired ejection fraction (<0.25) or prolonged QRS complex duration (>120ms) should be prioritised for ICD implantation.

**A** - Patients meeting criteria for ICD implantation who have prolonged QRS duration (>120ms) and NYHA class III-IV symptoms should be considered for cardiac resynchronisation therapy + defibrillator (CRT-D) therapy.

**A** - Patients surviving the following ventricular arrhythmias in the absence of acute ischaemia or treatable cause should be considered for ICD implantation:

- Cardiac arrest (*VT or VF*)
- VT with syncope or haemodynamic compromise
- VT without syncope if LVEF <0.35 (*not NYHA IV*)

**A** - Class 1 anti-arrhythmic drugs should not be used for treatment of premature ventricular beats or non-sustained VT in patients with previous MI.

**A** - Long term beta-blockers are recommended for routine use in post-MI patients without contraindications.

**A** - Amiodarone therapy is not recommended for post-MI patients or patients with congestive heart failure who do not have sustained ventricular arrhythmias or atrial fibrillation.

**B** - Sotalol therapy is not recommended for post-MI patients who do not have sustained ventricular arrhythmias or atrial fibrillation.

**B** - In patients who have recovered from an episode of sustained ventricular tachycardia (*with or without cardiac arrest*) who are not candidates for an ICD, amiodarone or sotalol should be considered.

**A** - Calcium channel blocker therapy is not recommended for reduction in sudden death or all-cause mortality in post-MI patients.

### **Arrhythmias Associated with Coronary Artery Bypass Graft Surgery (CABG)**

## **Risk Factors**

**D** - In patients undergoing coronary artery bypass graft surgery, age, previous AF and left ventricular ejection fraction should be considered when assessing risk of postoperative arrhythmia.

## **Prophylactic Interventions**

**A** - Amiodarone may be used when prophylaxis for atrial fibrillation and ventricular arrhythmias is indicated following CABG surgery.

**A** - Beta-blockers including sotalol may be used when prophylaxis for atrial fibrillation is indicated following CABG surgery.

**B** - Verapamil and diltiazem may be used for prophylaxis of atrial fibrillation following CABG surgery.

**B** - Digoxin should not be used for prophylaxis of atrial fibrillation following CABG surgery.

**C** - Glucose-insulin-potassium regimens should not be used for prophylaxis of atrial fibrillation following CABG surgery.

**A** - Magnesium may be used when prophylaxis for atrial fibrillation and ventricular arrhythmias is indicated following CABG surgery.

**A** - The choice of anaesthetic agent or technique and analgesia should be based on factors other than atrial fibrillation prophylaxis.

**A** - The choice of whether or not to use cardiopulmonary bypass should be based on factors other than atrial fibrillation prophylaxis.

**A** - Atrial pacing may be used for prophylaxis of AF in patients who have atrial pacing wires placed for other indications.

**A** - Bonded cardiopulmonary bypass circuits should not be used on the basis of AF prophylaxis alone.

**A** - Defibrillators should not be routinely implanted in patients with a poor left ventricular ejection fraction at the time of coronary artery bypass graft surgery.

## **Treatments for Atrial Fibrillation**

**D** - Patients with AF and haemodynamic compromise should have synchronized cardioversion.

- In the immediate postoperative period, patients with persistent AF without haemodynamic compromise should be treated with rate-limiting therapy.
- Patients with persistent AF should be considered for elective synchronized cardioversion.

## **Treatments for Ventricular Arrhythmias**

**D** - Patients with VF or pulseless VT should be defibrillated immediately.

- Intravenous adrenaline/epinephrine should be used for the management of patients with refractory VT/VF.
- Sternal reopening, internal heart massage and internal defibrillation should be considered in patients with refractory VT/VF.
- Intravenous amiodarone should be considered for the management of patients with refractory VT/VF.

**A** - Biphasic defibrillation should be used to terminate ventricular fibrillation that occurs on declamping the aorta.

## **Psychosocial Issues**

### **Psychosocial Assessment and Screening**

**D** - Patients with chronic cardiac arrhythmias should be screened for anxiety or depressive disorders with referral to specialist mental health services where appropriate.

**D** - Selective cognitive screening should be available especially for post arrest and older cardiac patients experiencing persistent memory or other cognitive difficulties.

### **Psychosocial Issues for ICD Recipients**

**C** - Psychosocial implications for people experiencing cardiac arrhythmias should be considered by all healthcare staff throughout assessment, treatment and care.

### **Psychosocial Interventions**

**B** - Psychosocial intervention offered as part of a comprehensive rehabilitation programme should encompass a cognitive behavioural component.

## **Definitions:**

### **Grades of Recommendation**

*Note: The grade of recommendation relates to the strength of the evidence on which the recommendation is based. It does not reflect the clinical importance of the recommendation.*

**A:** At least one meta-analysis, systematic review of randomized controlled trials (RCTs), or RCT rated as 1++ and directly applicable to the target population; *or*

A body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results

**B:** A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; *or*

Extrapolated evidence from studies rated as 1++ or 1+

**C:** A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; *or*

Extrapolated evidence from studies rated as 2++

**D:** Evidence level 3 or 4; *or*

Extrapolated evidence from studies rated as 2+

**Good Practice Points:** Recommended best practice based on the clinical experience of the guideline development group

### **Levels of Evidence**

**1++:** High quality meta-analyses, systematic reviews of randomised controlled trials (RCTs), or RCTs with a very low risk of bias

**1+:** Well-conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias

**1-:** Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias

**2++:** High quality systematic reviews of case control or cohort studies  
High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal

**2+:** Well-conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal

**2-:** Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal

**3:** Non-analytic studies (e.g. case reports, case series)

**4:** Expert opinion

### **CLINICAL ALGORITHM(S)**

None provided

## **EVIDENCE SUPPORTING THE RECOMMENDATIONS**

### **TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS**

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

## BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

### POTENTIAL BENEFITS

Appropriate management of cardiac arrhythmias in coronary heart disease

### POTENTIAL HARMS

- Amiodarone use may be associated with serious non-cardiac side effects including pneumonitis, thyroid disorders, liver dysfunction, photosensitivity and warfarin interaction. These side effects are related to the dose and duration of exposure to the drug.
- Although use of atrial pacing avoids the potential side effects of pharmacological measures it carries an extremely small risk of tamponade and death. There are potential infection problems if wires cannot be completely removed.
- The combination of beta-blocker plus verapamil can cause severe bradycardia and should normally only be prescribed by cardiologists.

## CONTRAINDICATIONS

### CONTRAINDICATIONS

- Eplerenone is contraindicated by the presence of renal impairment or high potassium levels.
- Tricyclic antidepressant drugs are associated with risk of cardiac arrhythmia and are considered to be contraindicated in acute myocardial infarction (see British National Formulary [BNF]; <http://www.bnf.org/bnf>).

## QUALIFYING STATEMENTS

### QUALIFYING STATEMENTS

- This guideline is not intended to be construed or to serve as a standard of care. Standards of care are determined on the basis of all clinical data available for an individual case and are subject to change as scientific knowledge and technology advance and patterns of care evolve. Adherence to guideline recommendations will not ensure a successful outcome in every case, nor should they be construed as including all proper methods of care or excluding other acceptable methods of care aimed at the same results. The ultimate judgement must be made by the appropriate healthcare professional(s) responsible for clinical decisions regarding a particular clinical procedure or treatment plan. This judgement should only be arrived at following discussion of the options with the patient, covering the diagnostic and treatment choices available. It is, however, advised that significant departures from the national guideline or any local guidelines derived from it

- should be fully documented in the patient's case notes at the time the relevant decision is taken.
- The evidence base in some areas (e.g., management of cardiac arrest and atrial fibrillation) does not accurately distinguish between patients whose arrhythmia has an ischaemic or non-ischaemic aetiology but wherever possible, the recommendations made are specific to coronary heart disease.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

Implementation of national clinical guidelines is the responsibility of each National Health Services (NHS) Board and is an essential part of clinical governance. It is acknowledged that every Board cannot implement every guideline immediately on publication, but mechanisms should be in place to ensure that the care provided is reviewed against the guideline recommendations and the reasons for any differences assessed and, where appropriate, addressed. These discussions should involve both clinical staff and management. Local arrangements may then be made to implement the national guideline in individual hospitals, units and practices, and to monitor compliance. This may be done by a variety of means including patient-specific reminders, continuing education and training, and clinical audit.

Key points for audit are identified in the original guideline document.

### IMPLEMENTATION TOOLS

Audit Criteria/Indicators  
Chart Documentation/Checklists/Forms  
Foreign Language Translations  
Patient Resources  
Quick Reference Guides/Physician Guides

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better  
Living with Illness

### IOM DOMAIN

Effectiveness  
Patient-centeredness  
Timeliness

## IDENTIFYING INFORMATION AND AVAILABILITY

### **BIBLIOGRAPHIC SOURCE(S)**

Scottish Intercollegiate Guidelines Network (SIGN). Cardiac arrhythmias in coronary heart disease. A national clinical guideline. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network (SIGN); 2007 Feb. 40 p. (SIGN publication; no. 94). [198 references]

### **ADAPTATION**

Not applicable: The guideline was not adapted from another source.

### **DATE RELEASED**

2007 Feb

### **GUIDELINE DEVELOPER(S)**

Scottish Intercollegiate Guidelines Network - National Government Agency [Non-U.S.]

### **SOURCE(S) OF FUNDING**

Scottish Executive Health Department

### **GUIDELINE COMMITTEE**

Not stated

### **COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE**

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## **FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST**

Declarations of interests were made by all members of the guideline development group. Further details are available from the Scottish Intercollegiate Guidelines Network (SIGN) Executive.

## **GUIDELINE STATUS**

This is the current release of the guideline.

Any amendments to the guideline in the interim period will be noted on [Scottish Intercollegiate Guidelines Network \(SIGN\) Web site](#).

## **GUIDELINE AVAILABILITY**

Electronic copies: Available in Portable Document Format (PDF) from the [Scottish Intercollegiate Guidelines Network \(SIGN\) Web site](#).

## **AVAILABILITY OF COMPANION DOCUMENTS**

The following are available:

- Quick reference guide: Heart disease. Scottish Intercollegiate Guidelines Network, 2007 Feb. 31 p. Available in Portable Document Format (PDF) from the [SIGN Web site](#).
- SIGN 50: A guideline developer's handbook. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network. (SIGN publication; no. 50). Available from the [SIGN Web site](#).
- Appraising the quality of clinical guidelines. The SIGN guide to the AGREE (Appraisal of Guidelines Research & Evaluation) guideline appraisal instrument. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network, 2001. Available from the [SIGN Web site](#).
- Management of coronary heart disease: A national clinical and resource impact assessment. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network, 2007 Feb. 120 p. Available in Portable Document Format (PDF) from the [SIGN Web site](#).
- Excel spreadsheets to assist health boards to estimate their local costs (used in conjunction with the national clinical and resource impact assessment). Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network, 2007 Feb. Available from the [SIGN Web site](#).

## **PATIENT RESOURCES**

The following is available:

- Arrhythmias for patients. Edinburgh (Scotland): Scottish Intercollegiate Guidelines Network, 2007 Feb. 32 p.

Available in Portable Document Format (PDF) from the [Scottish Intercollegiate Guidelines Network \(SIGN\) Web site](#). Urdu translation is also available from the [SIGN Web site](#).

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

## **NGC STATUS**

This summary was completed by ECRI Institute on April 23, 2007.

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