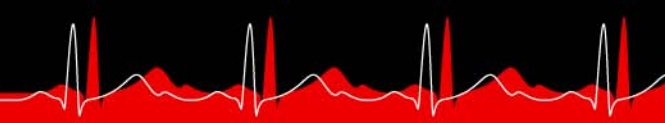


Guidelines for the management of acute coronary syndromes (ACS) 2006



National Heart Foundation of Australia and
Cardiac Society of Australia and New Zealand





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Guidelines for the management of acute coronary syndromes (ACS) 2006

- Developed* by
 - *Heart Foundation*
 - *The Cardiac Society of Australia and New Zealand (CSANZ).*
- The guidelines provide recommendations for:
 - management in hospitals
 - and other 'pre-hospital' settings – e.g. ambulance, rural/remote health clinics.

*Based on the best information available up to September 2005.

Definition

Acute Coronary Syndromes (ACS)

include 'a broad spectrum of clinical presentations, spanning ST elevation myocardial infarction through to an accelerated pattern of angina without evidence of myonecrosis'.¹

¹ Chew D, Allan R, Aroney C, Sheerin N. National data elements for the clinical management of acute coronary syndromes. Med J Aust 2005; 182 (9 Suppl): S1-S16.

Context

- ACS represent one of the most common causes of acute medical admissions to Australian hospitals.²
- Coronary heart disease (mainly heart attack) is the leading single cause of death:
 - 23,570 deaths in 2005 (12,433 males and 11,137 females).³

2 Australian Institute of Health and Welfare (AIHW) 2007. Australian hospital statistics 2005-06. Health services series no. 30. Cat. no. HSE 50. Canberra: AIHW.

3. Australian Bureau of Statistics (ABS) 2007. Causes of Death 2005. 3303.0: Canberra.

Purpose of the guidelines

- Provide evidence based recommendations (framework for practice) for the diagnosis and management of ACS
- Individual treatments may need to be adapted according to the patient's co-morbidities, drug tolerance, lifestyle and living circumstances.

Key messages



- Critical factors in treating ACS:
 - recognition (by both patient & doctor)
 - time
- Develop formal systems of care:
 - enhance appropriate treatment based on local context
 - vital to ensure optimal care for patients with ACS.

Key recommendation areas

1. Systems of care for patients with ACS
2. New ACS terminology and implications for diagnosis

**General
management**

3. Acute management of suspected ACS
4. Investigations
5. Management of patients with STEMI
6. Management of patients with non-ST-segment-elevation ACS (NSTEACS)
7. Long term management after control of myocardial ischaemia

**Clinical
management**

1. Systems of care for patients with ACS



Effective systems of care are required for better ACS outcomes.

Guiding principles:

- equity of access
- equity of care
- evidence-based care



1. Systems of care for patients with ACS

- Regionally based, with formal links with specialist centres for consultation and acute inter-hospital transfer.
- Cover the continuum of care from presentation to definitive care and rehabilitation.
- Include appropriate monitoring, feedback and quality improvement components.

2. New ACS terminology and implications for diagnosis

The diagnostic criteria for acute, evolving or recent myocardial infarction are defined as:


- Typical rise in the serum level of troponin or a more rapid rise in the serum level of the MB isoenzyme of creatine kinase (CK-MB) with at least one of the following:
 - Ischaemic symptoms
 - Development of pathological Q waves on the ECG
 - ECG changes indicative of ischaemia (ST-segment elevation or depression)
 - Coronary artery intervention

OR

- Pathological findings of an acute myocardial infarction

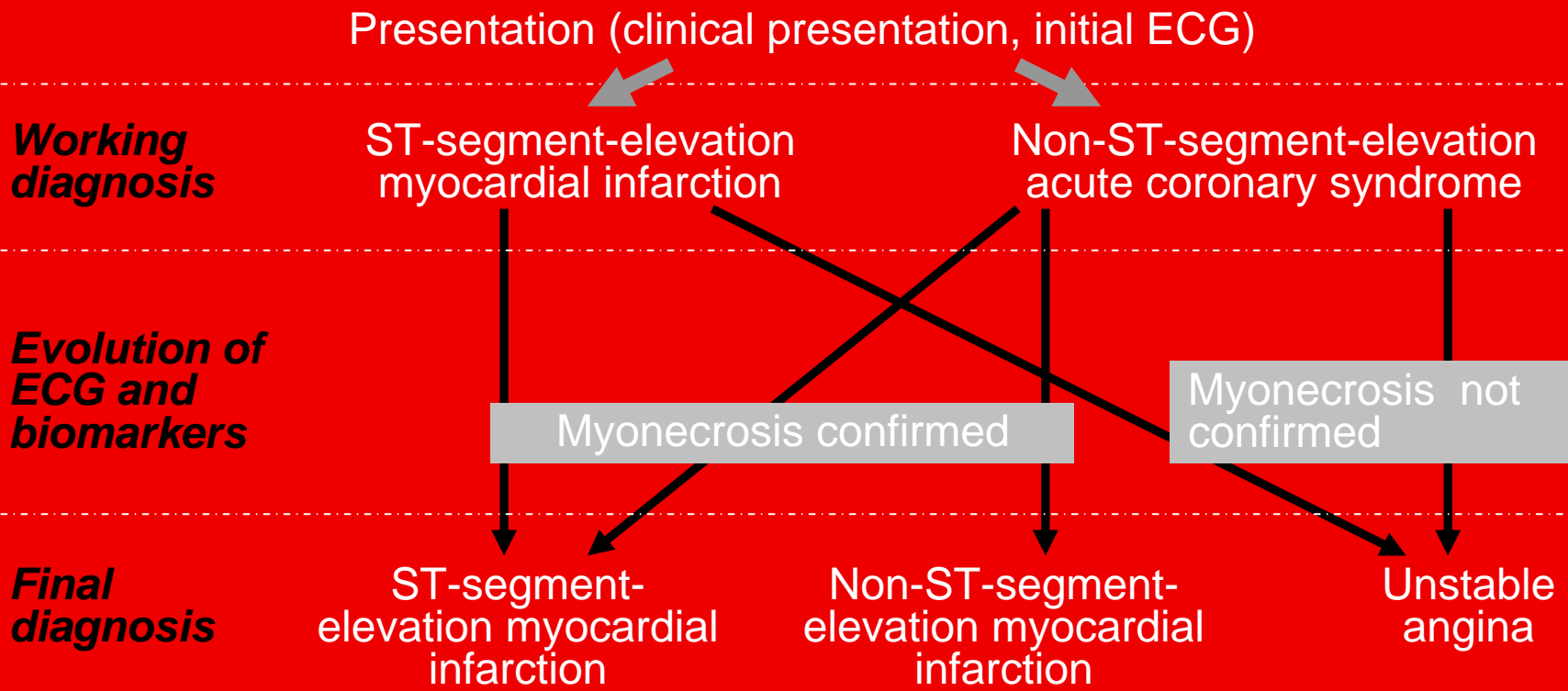
2. New ACS terminology and implications for diagnosis



- Evolving terminology - emergence of term “non-ST-segment-elevation acute coronary syndrome” (NSTEMACS).
- Shift from establishing definitive diagnosis on presentation  establishing initial working diagnosis to guide clinical decision-making.

2. New ACS terminology and implications for diagnosis

Defining ACS over time: presentation to final diagnosis



3. Acute management of suspected ACS

Signs and symptoms of ACS

- Chest discomfort at rest or for prolonged period (>10 minutes, not relieved by sublingual nitrates)
- Recurrent chest discomfort
- Discomfort associated with syncope or acute heart failure

Other presentations of ACS

- Back, neck, arm or epigastric pain, chest tightness, dyspnoea, diaphoresis, nausea, vomiting
- Atypical pain (including sharp and pleuritic pain) is more common in women, people with diabetes and older people

3. Acute management of suspected ACS



Getting to hospital

- People experiencing symptoms of ACS should seek help urgently (activating emergency medical services).
- Most important initial need is access to a defibrillator to avoid early reversible cardiac arrest due to arrhythmias.

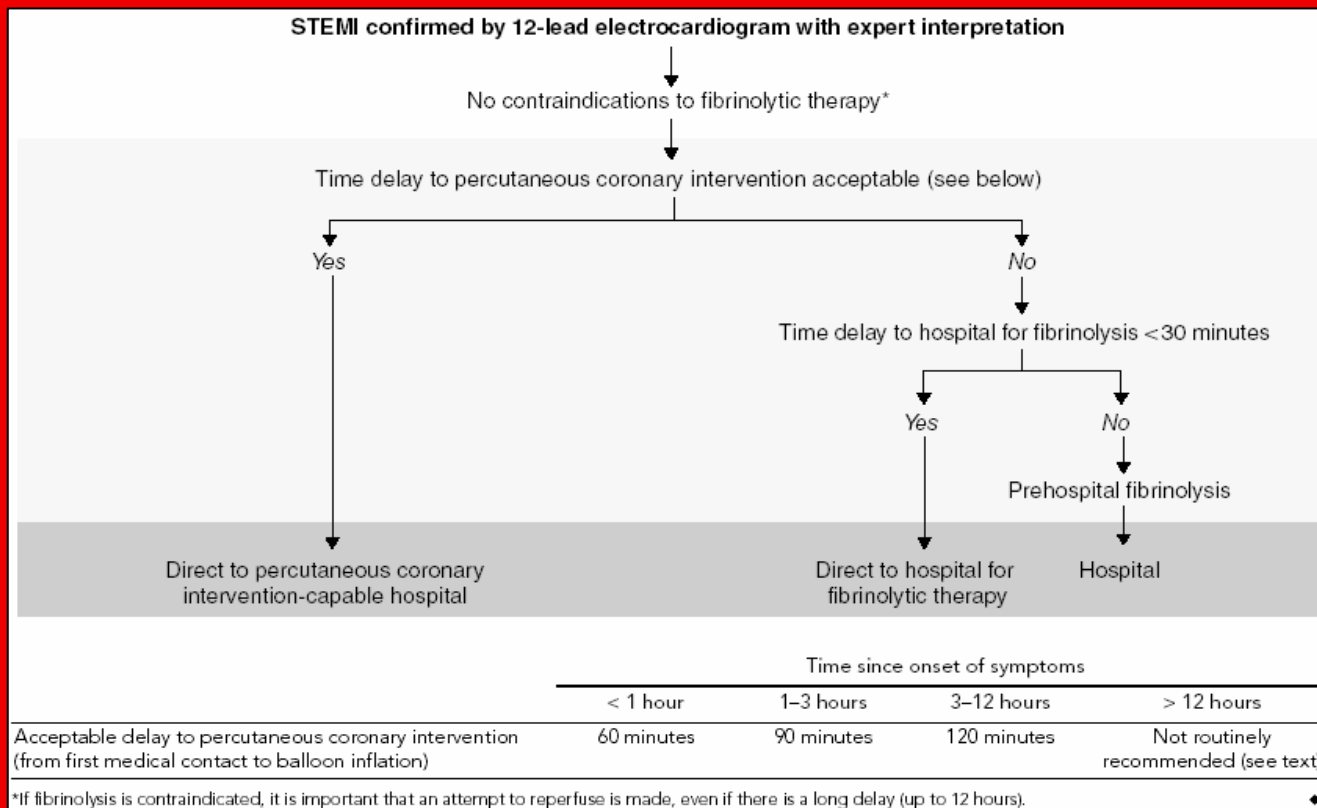
3. Acute management of suspected ACS

Early actions or actions in transit

- Give aspirin unless contraindicated or already taken
- Give oxygen
- Give glyceryl trinitrate and IV morphine as required
- Give advance warning to receiving medical facilities of incoming patients in whom there is a high suspicion of ACS
- Take a 12-lead ECG en route and transmit to medical facility, if possible

3. Acute management of suspected ACS

Prehospital management of STEMI



4. Initial Investigations



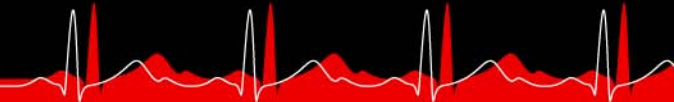
Immediate ECG	ECG is sole test required to select patients for emergency reperfusion
Blood tests	Serum troponin I or T levels (or CK-MB if troponin not available) Full blood count Serum creatinine (→ eGFR) and electrolyte levels Serum creatine kinase (CK) level Serum lipid levels within 24 hours Blood glucose level
Chest X-ray	Useful, but should not delay reperfusion treatment where indicated.

4. Initial investigations

Recommendations for measuring cardiac biomarkers

Cardiac biomarker	Recommendation
Troponin level (Cardiac troponin I or T)	<ul style="list-style-type: none">-On arrival-Not repeated if positive-Repeated ≥ 8 hours after last episode of pain or other symptoms of coronary insufficiency if initially negative-Serial troponin measurements in patients with NSTEMI suspected to be at high risk
Total CK level	<ul style="list-style-type: none">-Serial measurements performed for 48 hours in patients with myocardial infarction. Can be remeasured to confirm a second event if reinfarction is suspected later
CK-MB level	<ul style="list-style-type: none">-Measure in all patients with an ACS if troponin assay unavailable

5. Management of patients with STEMI



STEMI is defined as presentation with clinical symptoms consistent with an ACS with ECG features including any of:

- Persistent ST-segment elevation \geq 1mm in two contiguous limb leads;
- ST-segment elevation \geq 2mm in two contiguous chest leads; or
- New left bundle branch block (LBBB) pattern.

5. Management of patients with STEMI

- Implement reperfusion strategy promptly – in patients presenting within 12 hours of onset of symptoms
- Reperfusion with fibrinolytic therapy or primary PCI (and sometimes a combination of both).
- Coronary artery bypass graft (CABG) surgery may be more appropriate in patients:
 - who have suitable anatomy and are not candidates for fibrinolysis or PCI;
 - with cardiogenic shock; or
 - in association with mechanical repair.

5. Management of patients with STEMI



Adjuvant therapy associated with reperfusion

Antiplatelet therapy	Give aspirin and clopidogrel unless contraindicated.
Antithrombin therapy	Give in combination with PCI or fibrinolytic therapy with fibrin-specific fibrinolytic agents.
Glycoprotein IIb/IIIa inhibitors	Reasonable to use abciximab with primary PCI, but GP IIb/IIIa inhibitors should generally be avoided with fibrinolytic therapy.

5. Management of patients with STEMI



Choice of reperfusion therapy

- **PCI = treatment of choice**
if provided promptly by a qualified interventional cardiologist in appropriate facility.
- **Time = major factor for choice of reperfusion**
including time from symptom onset and time delay to reperfusion (including transportation).
- Other factors include contraindications to fibrinolytic therapy, location and size of infarction and other special circumstances.

5. Management of patients with STEMI



Time from symptom onset to first medical contact

- In general, the maximum delay from presentation to balloon inflation is:
 - 60 minutes if patient presents within one hour of symptom onset
 - 90 minutes if a patient presents later.

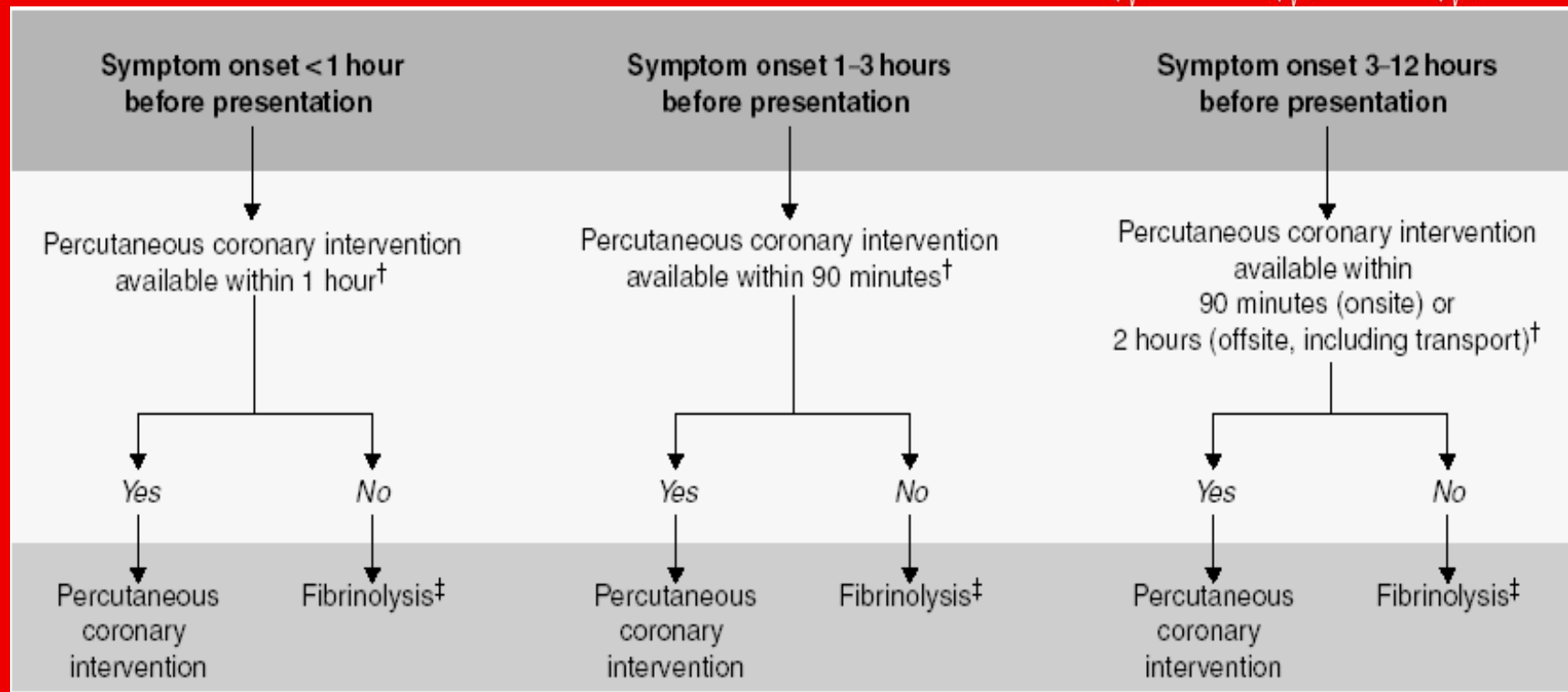
Note: for patients who present late (3–12 hours after symptom onset) to a facility without PCI capability, consideration of transfer for primary PCI is appropriate if balloon inflation can be achieved within 2 hours (including transport time).

5. Management of patients with STEMI

Time from symptom onset to first medical contact (cont'd)

- Fibrinolysis: consider early if PCI not readily available, particularly in rural and remote areas.
- Prehospital fibrinolysis: should be considered if there are major delays to hospitalisation (>30 minutes), and should be a component of local systems of care.
- Reperfusion is not routinely recommended in patients who present > 12 hours after symptom onset and who are asymptomatic and haemodynamically stable.

5. Management of patients with STEMI



Assumes no contraindications to fibrinolytic therapy

[†] Time delay refers to time from first medical contact to balloon

[‡] Patients with ongoing symptoms or instability should be transferred for PCI

Note: Reperfusion after 12 hours is indicated for cardiogenic shock, ongoing pain or haemodynamic instability.

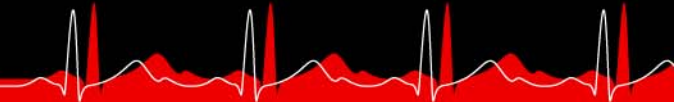
5. Management of patients with STEMI



Choice of fibrinolytic agent

- Fibrinolytics of choice: second generation fibrin-specific fibrinolytic agents available as a bolus (i.e. reteplase, tenecteplase).
- Should be available at all centres where fibrinolysis may be required.
- Streptokinase is an inappropriate choice in Aboriginal and Torres Strait Islander patients, or in patients with previous exposure to the drug.

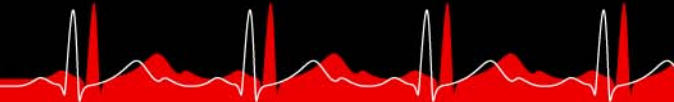
5. Management of patients with STEMI



Failed reperfusion

- Non-invasive findings suggestive of successful reperfusion include:
 - relief of symptoms;
 - restoration of haemodynamic or electrical stability; and
 - reduction by 50% of initial ST-segment-elevation within 60-90 minutes of initiation of therapy.

5. Management of patients with STEMI

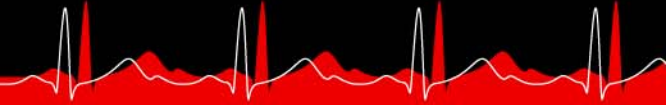


Failed reperfusion (cont'd)

- If fibrinolysis fails - consider rescue PCI (if can be performed within reasonable time).
- If reperfusion fails, or re-occlusion occurs in setting where rescue PCI cannot be performed within reasonable time - consider further medical reperfusion.

Note: balance between risk of myocardial infarction and risk of bleeding must be considered.

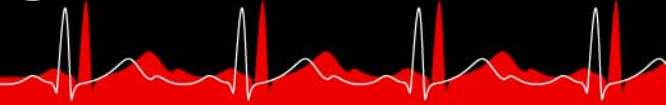
5. Management of patients with STEMI



Transfer after STEMI

- Consider early transfer to a tertiary cardiac centre with PCI facilities and links to cardiac surgical facilities, particularly in those with:
 - ongoing pain;
 - large area of myocardium at risk;
 - known poor left ventricular function; or
 - renal impairment.
- If immediate transfer not possible, transfer or refer patients as soon as is practical for assessment of need for revascularisation (through PCI or CABG).

6. Management of patients with NSTEMACS



- Patients with suspected ACS without ST-segment-elevation should undergo further observation and investigation to:
 - rule out other diagnoses;
 - enable risk stratification; and
 - determine appropriate treatment strategy.

6. Management of patients with NSTEMACS



Risk stratification

- Initial evaluation objectives:
 - define the likelihood of an ACS as the cause of a patient's presentation; and
 - determine the risk of short-term adverse outcomes, which will direct the management strategy.
- Most patients admitted with possible NSTEMACS will have intermediate-risk or high-risk features.

6. Management of patients with NSTEMACS

High-risk features of NSTEMACS

Presentation consistent with ACS and any of the following:

- Repetitive or prolonged (>10 min) ongoing chest pain or discomfort;
- Elevated level of at least one cardiac biomarker
- Persistent or dynamic ECG changes of ST-segment depression ≥ 0.5 mm or new T-wave inversion ≥ 2 mm;
- Transient ST-segment elevation (≥ 0.5 mm) in >2 contiguous leads;
- Haemodynamic compromise – systolic BP <90mmHg, cool peripheries, diaphoresis, Killip class >1, and/or new-onset mitral regurgitation;
- Sustained ventricular tachycardia;
- Syncope;
- Left ventricular systolic dysfunction;
- Prior PCI within 6 months or prior CABG;
- Presence of known diabetes (with typical symptoms of ACS); or
- Chronic kidney disease (est. GFR <60mL/min) (with typical symptoms of ACS).

6. Management of patients with NSTEMACS



Intermediate-risk features of NSTEMACS

Presentation with clinical features consistent with ACS and any of the following features AND NOT meeting the criteria for high-risk NSTEMACS:

- Chest pain or discomfort within past 48hrs that occurred at rest, or was repetitive or prolonged (but currently resolved);
- Age >65 years;
- Known CHD – prior MI with left ventricular ejection fraction ≥ 0.40 , or known coronary lesion >50% stenosed;
- No high-risk changes on ECG;
- Two or more of the following risk factors: known hypertension, family history, active smoking or hyperlipidaemia;
- Presence of known diabetes (with atypical symptoms of ACS);
- Chronic kidney disease (est.GFR <60mL/min) (with atypical symptoms of ACS); or
- Prior aspirin use.

6. Management of patients with NSTEMACS



Low-risk features of NSTEMACS

Presentation with clinical features consistent with ACS without intermediate-risk or high-risk features. This includes:

- onset of anginal symptoms within the last month; or
- worsening in severity or frequency of angina; or
- lowering of anginal threshold.

6. Management of patients with NSTEMIACS

Treatment strategies

High-risk NSTEMIACS

Intermediate-risk NSTEMIACS

Low-risk NSTEMIACS

Aggressive medical management
and
coronary angiography and revascularisation

Further observation and risk stratification
↓
Reclassification into either high risk or low risk

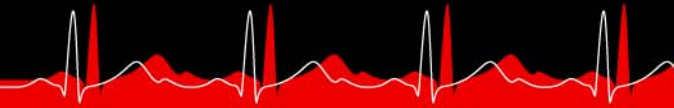
Discharge on upgraded medical therapy
with
urgent cardiac follow-up

6. Management of patients with NSTEMI/ACS

Early medical management of NSTEMI/ACS

Low-risk and intermediate-risk NSTEMI/ACS	High-risk NSTEMI/ACS
Aspirin	Aspirin Clopidogrel (unless immediate angiography planned, or patient at high-risk of requiring surgery) Unfractionated heparin or subcutaneous enoxaparin Intravenous tirofiban or eptifibatid Beta-blocker

7. Long term management after control of myocardial ischaemia



Prior to discharge, provide ACS patients with a medication regimen including:

- antiplatelet agent(s)
- beta-blocker
- ACE inhibitor
- statin
- short-acting nitrate
- other therapies as appropriate, e.g. warfarin, insulin, aldosterone antagonists.

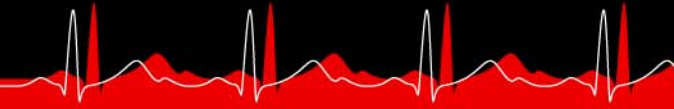
7. Long term management after control of myocardial ischaemia



Other discharge and longer term considerations

- Give **lifestyle advice** to reduce the risk of further CHD events, including smoking cessation, nutrition, alcohol, physical activity and weight management as relevant.
- Recommend a diet high in omega-3 fatty acids from fish and the use of **fish oil** tablets.
- Refer patients to comprehensive **ongoing prevention and cardiac rehabilitation**.

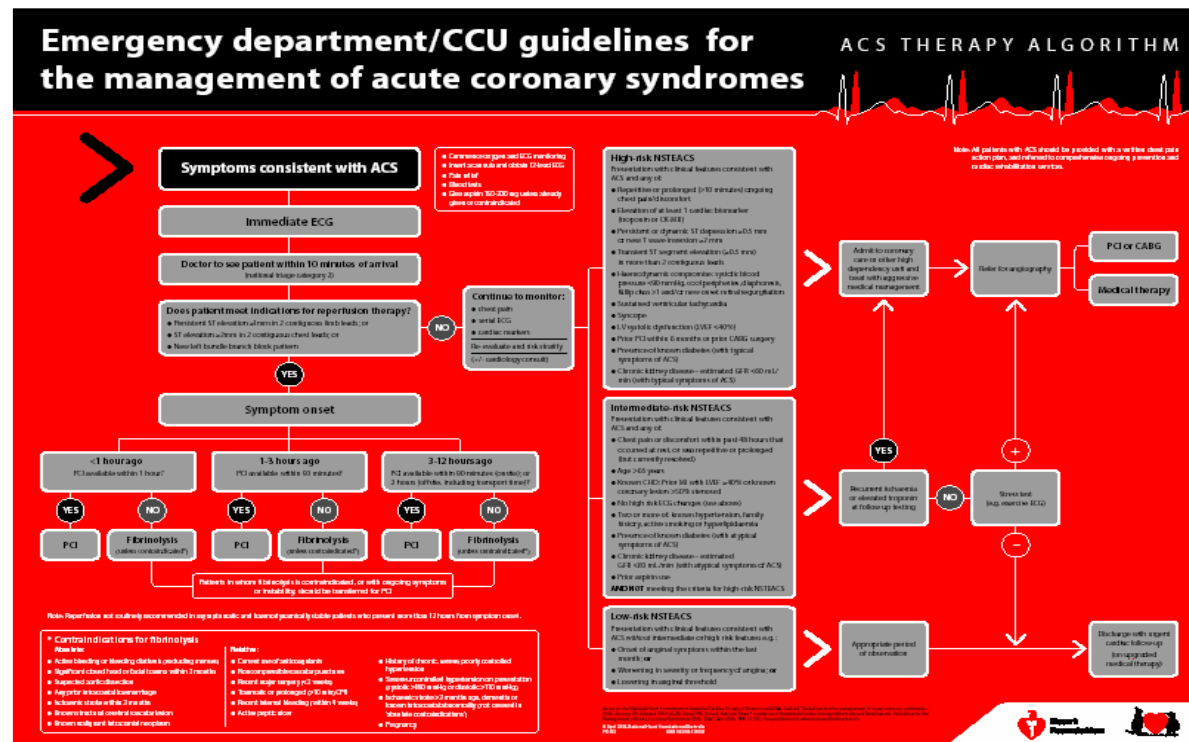
7. Long term management after control of myocardial ischaemia



Other discharge and longer term considerations

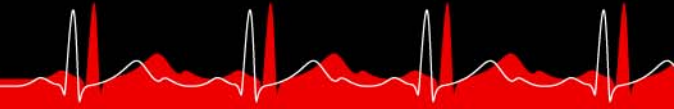
- Consider **ICD implantation** in some patients who, despite optimal medical therapy, have persistently depressed left ventricular function >6 weeks after STEMI.
- Provide patients with a **written action plan** for chest pain.
- **Assess** patients for **depression and level of social support**.
- Consider early **glucose tolerance test** in patients without diagnosed diabetes.

ACS treatment algorithm



Copies of the ACS Therapy Algorithm are available from the Heart Foundation's heart health information service on 1300 36 27 87, or can be accessed from the Heart Foundation website: www.heartfoundation.org.au

Conclusion

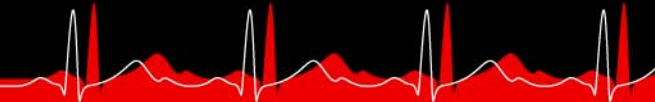


A better understanding of the pathophysiology of ACS has developed along with more accurate diagnostic tools, better risk stratification and improved medical and invasive treatments. However, these advances have led to an increase in the complexity of possible treatment strategies.



Endorsing organisations





Guidelines for the Management of Acute Coronary Syndromes 2006 can be accessed from the Heart Foundation website:

www.heartfoundation.org.au

The current recommendations will be updated as required to provide a continuing resource to health providers. Check the Heart Foundation website regularly for updates.



Interested individuals are invited to register with the Heart Foundation's heart health information service, to receive notification of updates to these guidelines and related activities.

In addition, we may contact you to invite your participation in implementation and evaluation activities.

To register, email your name to heartline@heartfoundation.org.au
With 'ACS' in the subject line.

The Heart Foundation respects your privacy and embraces the National Privacy Principles in regulating how we collect, use, disclose and hold your personal information. If you have any questions about Privacy, please call (03) 9329 8511 and ask for the Privacy Officer.



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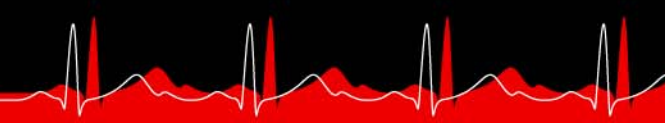
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