



**PROPOSED REVIEW OF SIGN GUIDELINE
CONSULTATION SUMMARY**

Title of guideline	SIGN 93: Acute Coronary Syndrome
Date of publication	February 2007
SIGN summary of the scoping search	<p>Guidelines:</p> <p>Apple FS et al, National Academy of Clinical Biochemistry, IFCC Committee for Standardization of Markers of Cardiac Damage. National Academy of Clinical Biochemistry and IFCC Committee for Standardization of Markers of Cardiac Damage Laboratory Medicine Practice Guidelines: Analytical issues for biochemical markers of acute coronary syndromes. <i>Circulation</i> 2007 Apr 3;115(13):e352-5. http://circ.ahajournals.org/cgi/content/full/115/13/e352</p> <p>Anderson JL et al. ACC/AHA 2007 guidelines for the management of patients with unstable angina/non-ST-Elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the 2002 Guidelines for the Management of Patients With Unstable Angina/Non-ST-Elevation Myocardial Infarction) developed in collaboration with the American College of Emergency Physicians, the Society for Cardiovascular Angiography and Interventions, and the Society of Thoracic Surgeons endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation and the Society for Academic Emergency Medicine. <i>Am Coll Cardiol</i> 2007 Aug 14;50(7):e1-e157. http://www.guideline.gov/content.aspx?id = 11333</p> <p>Finnish Medical Society Duodecim. Acute coronary syndromes: unstable angina pectoris and non-ST segment elevation myocardial infarction (NSTEMI). In: <i>EBM Guidelines. Evidence-Based Medicine</i> [Internet]. Helsinki, Finland: Wiley Interscience. John Wiley & Sons; 2007. http://www.guideline.gov/content.aspx?id = 12805</p> <p>Finnish Medical Society Duodecim. Differential diagnosis of chest pain. In: <i>EBM Guidelines. Evidence-Based Medicine</i> [Internet]. Helsinki, Finland: Wiley Interscience. John Wiley & Sons; 2008 http://www.guideline.gov/content.aspx?id = 12790&search = myocardial + infarction</p> <p>Finnish Medical Society Duodecim. Myocardial infarction. In: <i>EBM Guidelines. Evidence-Based Medicine</i> [Internet]. Helsinki, Finland: Wiley Interscience. John Wiley & Sons; 2008. http://www.guideline.gov/content.aspx?id = 12794</p> <p>Finnish Medical Society Duodecim. Thrombolytic therapy and balloon angioplasty in acute ST elevation myocardial infarction (STEMI). In: <i>EBM Guidelines. Evidence-Based Medicine</i> [Internet]. Helsinki, Finland: Wiley Interscience. John Wiley & Sons; 2008. http://guidelines.gov/content.aspx?id = 12801</p> <p>Goodman SG et al. Acute ST-segment elevation myocardial infarction: American College of Chest Physicians evidence-based clinical practice guidelines (8th edition). <i>Chest</i>. 2008 Jun;133(6 Suppl):708S-775S.</p>

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Patient support

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Main conclusions from new evidence

Diagnosis

- Signs and symptoms and prediction tools do not play an important role in the prompt diagnosis of acute coronary syndrome.
- when using the Sgarbossa electrocardiogram algorithm a score of 3 or more was useful for diagnosing acute myocardial infarction (AMI) and patients with symptoms suggesting AMI should receive immediate intervention when this score is reached.
- absence of ST elevation in aVR (right arm lead in an electrocardiogram) appeared to exclude left main stem stenosis as the cause for myocardial infarction, but its presence can indicate a lesion in the proximal left anterior descending artery.
- multi-detector computed tomography angiography could be used for early exclusion of non-ST-elevation myocardial infarction and unstable angina in patients in acute settings.
- in patients undergoing coronary angiography or intervention, radial access reduces major bleeding and may also reduce ischaemic events compared to femoral access.

Pharmacological treatment

- Beta-blockers given with 72 hours of an acute myocardial infarction did not reduce short-term mortality but may be of benefit in low-risk patients. There is good evidence for lack of a mortality benefit with immediate or short-term treatment with beta-blockers and calcium channel blockers for

acute myocardial infarction.

- clopidogrel was effective for reducing adverse cardiovascular events in patients with non-ST-elevation-acute coronary syndrome. There was insufficient evidence to enable conclusions to be drawn on treatment duration and a rebound effect on withdrawal of treatment.
- combined clopidogrel and aspirin reduced the likelihood of major cardiovascular events associated with acute coronary syndrome or percutaneous coronary intervention compared with monotherapy, but increased the likelihood of major bleeding.
- a higher clopidogrel loading dose regimen is superior to a standard (300 mg) loading regimen in patients undergoing percutaneous coronary intervention. The benefits are greater in patients at higher risk.

- early administration of glycoprotein IIb/IIIa inhibitors in patients who underwent primary angioplasty for ST-segment elevation myocardial infarction was associated with significant benefits in pre-procedural epicardial recanalisation and ST-segment resolution. These translated into non-significant mortality benefits, except with abciximab, where there was a significant reduction in mortality.
- no difference could be identified between abciximab and small-molecule glycoprotein IIb/IIIa inhibitors in patients undergoing primary percutaneous coronary intervention (PCI) for ST-segment elevation myocardial infarction.
- the use of glycoprotein IIb/IIIa in patients pre-treated with clopidogrel did not reduce death, post-procedural myocardial infarction or TVR and significantly increased the risk of bleeding
- when administered during PCI, intravenous glycoprotein IIb/IIIa blockers reduce the risk of death and of death or MI at 30 days and at six months, at a price of an increase in the risk of severe bleeding. The efficacy effects are homogeneous but are less marked in patients pre-treated with clopidogrel where they seem to be effective only in patients with ACS. When administered as initial medical treatment in patients with NSTEMI/ACS, these agents do not reduce mortality although they slightly reduce the risk of death or MI.
- current evidence does not support the routine use of reduced-dose thrombolytic and glycoprotein IIb/IIIa inhibitor therapy-facilitated percutaneous coronary intervention for the treatment of acute ST-segment elevation myocardial infarction.
- Abciximab reduces death and reinfarction rates in patients undergoing primary stenting for acute ST-elevation myocardial infarction.

- Low molecular weight heparins are associated with a reduction in reinfarction and a trend towards reduced mortality, but with a higher risk of major bleeding complications, compared with unfractionated heparin.
- Compared to placebo, patients treated with heparins had a similar risk of mortality, revascularization, recurrent angina, major bleeding and thrombocytopenia. However, those treated with heparins had a decreased risk of MI and a higher incidence of minor bleeding.
- In a study comparing enoxaparin with unfractionated heparin in patients with acute coronary syndrome enoxaparin had a significant net clinical benefit, particularly for patients with ST-segment elevation myocardial infarction. Subcutaneous administration of dalteparin, enoxaparin or reviparin in hospital, as an adjunct to various thrombolytics in ST-elevation acute myocardial infarction, appears feasible and at least as effective and safe as intravenous unfractionated heparin.
- use of bivalirudin in patients who underwent coronary angioplasty was associated with significant reductions in major bleeding complications and no difference in mortality compared with unfractionated heparin.
- it is unlikely that magnesium is beneficial in reducing mortality both in patients treated early and in patients treated late, and in patients already receiving thrombolytic therapy; (2) it is unlikely that magnesium will reduce mortality when used at high dose (> = 75 mmol); (3) magnesium treatment may reduce the incidence of ventricular fibrillation, ventricular

tachycardia, severe arrhythmia needing treatment or Lown 2-5, but it may increase the incidence of profound hypotension, bradycardia and flushing; and (4) the areas of uncertainty regarding the effect of magnesium on mortality remain the effect of low dose treatment (< 75 mmol) and in patients not treated with thrombolysis.

- nicorandil treatment as an adjunct to coronary reperfusion therapy improved microvascular function, increased left ventricular ejection fraction and reduced left ventricular end-diastolic volume index.
- statin therapy slowly produces benefit in patients with acute coronary syndromes, such that all-cause mortality, cardiovascular mortality, unstable angina and revascularisation are all reduced at around 24 months.
- intensive-dose statin therapy reduced all-cause mortality in patients with recent acute coronary syndrome but not in patients with stable coronary heart disease, compared with moderate-dose statin therapy. It increased the risk of a statin-induced adverse event.
- Early intensive lipid lowering with high-dose/potency statins for high risk ACS patients significantly reduced the risk of death or major cardiovascular event in comparison with standard lipid lowering regimens.
- Drug-eluting stents are effective in reducing rates of target lesion revascularisation in patients with acute myocardial infarction, without increasing the risk of stent thrombosis at one year. A second trial found they increased late stent thrombosis.
- Drug-eluting stents releasing sirolimus, paclitaxel, dexamethasone and zotarolimus reduce composite cardiac events. However, this reduction is due largely to reductions in repeat revascularisation rates as there is no evidence of a significant effect on rates of death, MI or thrombosis. The increased cost of drug-eluting stents and lack of evidence of their cost-effectiveness means that various health funding agencies have to limit or regulate their use in relation to price premium.
- compared to paclitaxel-eluting stents, sirolimus-eluting stents reduced the need for revascularisation.
- no difference was found in overall long-term survival or survival free of myocardial infarction between sirolimus-eluting stents and bare metal stents. The need for re-intervention was reduced with sirolimus-eluting stents, but the risk of thrombosis was no less. Sirolimus-eluting stents were associated with a lower rate of major adverse cardiac events than bare-metal stents in the management of patients with ST-segment elevation myocardial infarction over one year of follow-up.

Treatment

- Angioplasty is superior to thrombolysis for 1-month fatal and nonfatal outcomes in patients with non-ST myocardial infarction where the time delay is 30 to 90 minutes.
- catheter thrombus aspiration devices are beneficial in reducing mortality in acute ST-segment-elevation myocardial infarction, compared to percutaneous coronary intervention alone. However, mechanical thrombectomy devices appeared to increase mortality, and embolic protection devices had a neutral effect.
- among patients with ST-segment elevation myocardial infarction, transfer for mechanical perfusion reduced 30-day mortality, infarction and stroke rates.
- adjunctive devices, particularly thrombectomy devices, during mechanical reperfusion in ST-elevation acute myocardial infarction patients, may be associated with reduction of angiographically evident distal embolisation and improved myocardial blush grade < 3

rates compared to standard percutaneous coronary interventions.

- use of adjunctive manual thrombectomy devices in addition to percutaneous coronary intervention in people with ST-segment elevation myocardial infarction improves outcomes, including mortality at 30 days. Adjunctive mechanical devices are safe and associated with better perfusion and decreased embolisation in patients with acute myocardial infarction.
- there is insufficient evidence to support current recommendations for the use of intra-aortic balloon pump therapy in ST-segment elevation myocardial infarction complicated by cardiogenic shock.
- compared to intra-aortic balloon pumps, percutaneous left ventricular devices improved haemodynamic parameters in people with cardiogenic shock but there was no reduction in death at 30 days. Adverse effects were higher with LVADs.
- Noninvasive pressure support ventilation appeared to be as safe and efficacious as continuous positive airway pressure in treatment of acute cardiogenic pulmonary oedema if titrated rather than fixed pressures were employed.
- high-flow oxygen may increase the infarct size and risk of mortality.
- people with higher risk acute myocardial infarction lesions (including thrombus) treated with AngioJet then PCI, had similar outcomes compared with lower risk lesions treated with percutaneous coronary intervention alone.
- a meta-analysis assessing the benefits of an early invasive strategy following fibrinolytic therapy in patients with ST-segment myocardial infarction found that, using contemporary methods, an early invasive strategy appeared to significantly improve mortality and rate of reinfarction.
- rescue PCI is associated with improved clinical outcomes for ST-segment myocardial infarction patients after failed fibrinolytic therapy, but there are potential risks.
- compared with fibrinolysis, primary PCI was associated with short-term reductions in mortality, reinfarction and stroke in ST-segment elevation myocardial infarction. PCI was associated with long-term reductions in mortality and reinfarction in randomised controlled trials, but not in observational studies.
- compared with transfemoral PCI, transradial PCI reduced major bleeding and major adverse events in people with acute ST-segment-elevation myocardial infarction.
- there was a modest benefit for rescue PCI compared to repeat thrombolysis in failed thrombolysis.
- Bed rest ranging from 2 to 12 days appears to be as safe as longer periods of bed rest. The quality of most trials is unsatisfactory. Current bed rest recommendations are not supported by the existing evidence as the optimal duration of bed rest is unknown.
- after MI bare-metal stenting was superior to balloon angioplasty for angiographic outcomes (reocclusion, restenosis, target vessel revascularisation), but that clinical outcomes were similar (mortality,

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	<p>reinfarction).</p> <ul style="list-style-type: none"> ▪ Compared to a conservative strategy for UA/NSTEMI, an invasive strategy is associated with reduced rates of refractory angina and rehospitalization in the shorter term and myocardial infarction in the longer term. However, the invasive strategy is associated with a doubled risk of procedure-related heart attack and increased risk of bleeding and procedural biomarker leaks. Evidence supports the use of a conservative strategy in low-risk women. ▪ the current evidence does not clearly support the superiority of a routine invasive strategy over a selective invasive strategy in terms of the risk of mortality or nonfatal myocardial infarction in patients with non-ST-segment elevated acute coronary syndrome. ▪ there is little evidence to assess the clinical effects of stem cell treatment for myocardial infarction. <p><u>Patient support</u></p> <ul style="list-style-type: none"> ▪ Psychological treatment of cardiac patients reduces the risk of mortality in men. The effect was present in short- but not long-term follow-up, and not present in women. 		
<p>New areas that could be added to the guideline</p>	<ul style="list-style-type: none"> ▪ Use of electrocardiogram algorithms in diagnosis ▪ CT angiography for diagnosis ▪ nicorandil therapy ▪ stenting (bare metal and drug eluting) ▪ angioplasty in patients with non-ST elevation ▪ catheter thrombus aspiration devices ▪ transradial vs transfemoral PCI ▪ fibrinolytic therapy 		
<p>Summary of the recommendations that could be updated</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 70%; padding: 5px;"> <p>Patients with an acute coronary syndrome should be commenced on long term statin therapy prior to hospital discharge. (B)</p> <p>Patients with an acute coronary syndrome complicated by cardiogenic shock, myocardial rupture (<i>ventricular septal defect and papillary muscle rupture</i>) or refractory ischaemia should be considered for intra-aortic balloon counterpulsation especially when contemplating emergency coronary revascularisation or corrective surgery. (D)</p> </td> <td style="width: 30%; padding: 5px; vertical-align: top;"> <p>Section:</p> <p>7.2</p> <p>8.3</p> </td> </tr> </table>	<p>Patients with an acute coronary syndrome should be commenced on long term statin therapy prior to hospital discharge. (B)</p> <p>Patients with an acute coronary syndrome complicated by cardiogenic shock, myocardial rupture (<i>ventricular septal defect and papillary muscle rupture</i>) or refractory ischaemia should be considered for intra-aortic balloon counterpulsation especially when contemplating emergency coronary revascularisation or corrective surgery. (D)</p>	<p>Section:</p> <p>7.2</p> <p>8.3</p>
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Please answer the following questions as fully as possible:

Name, designation, organisation:	Cardiology (1), Psychology (1), Pharmacy (1)
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1(a)	Is there still a requirement for an evidence-based guideline on this topic?	
	Yes	
1(b)	If no, should the guideline be withdrawn?	
2(a)	Based on the information given above, and your own clinical judgement, does the guideline require revision in the light of new evidence? <i>Please give details.</i>	
	Section 2: could be updated with new evidence on ECG Section 4: an update with respect to rescue PCI is required. The guidance on intervention is brief as this was not in the remit of SIGN 93 but PPCI is now more established across Scotland. Section 5: The timing of intervention and risk benefit could be updated and a section could be added on treatment of women. Section 7: Newer anti-platelet agents and an update on statins could be added Section 7.1: could be updated.	
2(b)	If no, is there a need to scope for new evidence on a yearly basis?	
2(c)	Do you agree with the assessment of the impact of the new evidence and its likely effect on recommendations?	
	Broadly	
2(d)	If yes, please suggest clinical questions that could be addressed in the revision?	
3(a)	Please list any additions to the remit of the guideline that you think would be beneficial	
3(b)	Please list any sections of the guideline that are no longer required	
4	Please tick your preferred option for reviewing this guideline	
	a. there is no new evidence that will affect existing recommendations and the guideline should not be reviewed at this time	
	b. some recommendations will change in the light of the new evidence and elements of the guideline should be reviewed	✓

5	SIGN COUNCIL	Date: 11/11/2011	
Revalidate	Refresh	Revise	Remove
		✓	