Complete Summary

GUIDELINE TITLE

Differential diagnosis of chest pain.

BIBLIOGRAPHIC SOURCE(S)

Finnish Medical Society Duodecim. Differential diagnosis of chest pain. In: EBM Guidelines. Evidence-Based Medicine [Internet]. Helsinki, Finland: Wiley Interscience. John Wiley & Sons; 2004 Sep 14 [Various].

GUIDELINE STATUS

Note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

- Myocardial ischaemic pain
- Nonischaemic chest pain

GUIDELINE CATEGORY

Diagnosis

CLINICAL SPECIALTY

Cardiology
Emergency Medicine
Family Practice
Internal Medicine

INTENDED USERS

Health Care Providers
Physicians

GUIDELINE OBJECTIVE(S)

Evidence-Based Medicine Guidelines collect, summarize, and update the core clinical knowledge essential in general practice. The guidelines also describe the scientific evidence underlying the given recommendations.

TARGET POPULATION

Individuals with chest pain

INTERVENTIONS AND PRACTICES CONSIDERED

Differential Diagnosis of Myocardial Ischaemic Pain

1. Assessment of signs and symptoms (e.g., description of pain; duration and location of pain)
2. Electrocardiogram (monitoring minor signs of myocardial infarction and changes resembling those of myocardial infarction)
3. Measurement of markers of myocardial injury (cardiac troponins T and I, creatine kinase-MB)
4. Blood gas analysis
5. Acute Cardiac Ischaemia diagnostic instrument
6. Acute Cardiac Ischaemia Time-Insensitive Predictive Instrument
7. Goldman chest pain protocol
8. Electrocardiogram exercise test

MAJOR OUTCOMES CONSIDERED

Predictive value of diagnostic instruments in diagnosing chest pain

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 reviewed was collected from the Cochrane database of systematic reviews and the Database of Abstracts of Reviews of Effectiveness (DARE). In addition, the Cochrane Library and medical journals were searched specifically for original publications.

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

A. Strong research-based evidence. Multiple relevant, high-quality scientific studies with homogenic results.
B. Moderate research-based evidence. At least one relevant, high-quality study or multiple adequate studies.
C. Limited research-based evidence. At least one adequate scientific study.
D. No research-based evidence. Expert panel evaluation of other information.

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Not stated

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Not stated

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary. The recommendations that follow are based on the previous version of the guideline.

The levels of evidence [A-D] supporting the recommendations are defined at the end of the "Major Recommendations" field.

Objectives

- Pain caused by myocardial ischaemia or impending infarction must be differentiated from nonischaemic chest pain. Nonischaemic pain may be caused by other severe conditions that require acute treatment, such as pericarditis, aortic dissection, and pulmonary embolism.
- Remember that patients at risk can have ischaemic chest pain in addition to nonischaemic chest pain.
- Differentiate between stable and unstable angina.

Myocardial Ischaemic Pain

- The main feature of myocardial ischaemia (impending infarction) is usually prolonged chest pain. Typical characteristics of the pain include:
    - Duration usually over 20 minutes
    - Located in the retrosternal area, possibly radiating to the arms (usually to the left arm), back, neck, or the lower jaw
    - The pain is described as pressing or heavy or as a sensation of a tight band around the chest; breathing or changing posture does not notably influence the severity of the pain.
    - The pain is continuous, and its intensity does not alter
    - The symptoms (pain beginning in the upper abdomen, nausea) may resemble the symptoms of acute abdomen. Nausea and vomiting are sometimes the main symptoms, especially in inferoposterior wall ischaemia.
    - In inferoposterior wall ischaemia, vagal reflexes may cause bradycardia and hypotension, presenting as dizziness or fainting.
- Electrocardiogram (ECG) is the key examination during the first 4 hours after pain onset, but normal ECG does not rule out an imminent infarction.
- Markers of myocardial injury (cardiac troponins T and I, creatine kinase-MB mass) start to rise about 4 hours after pain onset. An increase of these markers is diagnostic of myocardial infarction irrespective of ECG findings.
- Minor signs of myocardial infarction in ECG, see Table 1 in the original guideline document

Nonischaemic Causes of Chest Pain

- For nonischaemic causes of chest pain, see Table 2.
- For ECG changes resembling those of a myocardial infarction (MI), see Table 3.

Table 2. Nonischaemic Causes of Chest Pain

Illness/condition	Differentiating symptoms and signs
Reflux oesophagitis, oesophageal spasm	• No ECG changes • Heartburn • Worse in recumbent position, but also while straining, like angina pectoris • The most common cause of chest pain
Pulmonary embolism	• Tachypnoea, hypoxaemia, hypocarbia • No pulmonary congestion on chest x-ray • Clinical presentation may resemble hyperventilation. • Both arterial oxygen pressure (PaO_2) and partial arterial pressure of carbon dioxide ($PaCO_2$) decreased. • Pain is not often marked. • D-dimer assay positive
Hyperventilation	Hyperventilation Syndrome • The main symptom is dyspnoea, as in pulmonary embolism. • Often a young patient • Tingling and numbness of the limbs, dizziness • $PaCO_2$ decreased, PaO_2 increased or normal Secondary Hyperventilation • Attributable to an organic illness/cause; acidosis, pulmonary embolism, pneumothorax, asthma, infarction, etc.
Spontaneous pneumothorax	• Dyspnoea is the main symptom. • Auscultation and chest x-ray
Aortic dissection	• Severe pain with changing localization • Type A dissection sometimes obstructs the origin of a coronary artery (usually the right) with signs of impending inferoposterior infarction • Pulses may be asymmetrical • Sometimes broad mediastinum on chest x-ray • New aortic valve regurgitation
Pericarditis	• Change of posture and breathing influence the pain. • A friction sound may be heard. • ST-elevation but no reciprocal ST depression
Pleuritis	• A stabbing pain when breathing. The most common

Illness/condition	Differentiating symptoms and signs
	cause of stabbing pain is, however, caused by prolonged cough
Costochondral pain	• Palpation tenderness, movements of chest influence the pain • Might also be an insignificant incidental finding
Early herpes zoster	• No ECG changes, rash • Localized paraesthesia before rash
Ectopic beats	• Transient, in the area of the apex
Peptic ulcer, cholecystitis, pancreatitis	• Clinical examination (inferior wall ischaemia may resemble acute abdomen)
Depression	• Continuous feeling of heaviness in the chest, no correlation to exercise • ECG normal
Alcohol-related	• A young male patient in a casualty department, inebriated

Table 3. ECG Changes Resembling Those of an MI

ST changes resembling those of acute ischaemia	
ST segment elevation	Early repolarization in V1–V3. Seen particularly in athletic men ("athlete's heart") Acute myopericarditis in all leads except V1, aVR. Not resolved with a beta-blocker. Pulmonary embolism – in inferior leads Hyperkalaemia Hypertrophic cardiomyopathy
ST segment depression	Sympathicotonia Hyperventilation Pulmonary embolism Hypokalaemia Digoxin Antiarrhythmics Psychiatric medication Hypertrophic cardiomyopathy Reciprocal ST depression of an inferior infarction in leads V2–V3–V4 Circulatory shock
QRS changes resembling those of Q wave infarction	Hypertrophic cardiomyopathy Wolff-Parkinson-White (WPW) syndrome Myocarditis Blunt cardiac injury

ST changes resembling those of acute ischaemia	
	Massive pulmonary embolism (QS in leads V1–V3) Pneumothorax Cardiac amyloidosis Cardiac tumours Progressing muscular dystrophy Friedreich's ataxia
ST changes resembling those of a non-Q wave infarction	Increased intracranial pressure – subarachnoid bleed – skull injury Hyperventilation syndrome Post-tachyarrhythmia state Circulatory shock – haemorrhage – sepsis Acute pancreatitis Myopericarditis

Related Evidence

The Acute Cardiac Ischaemia (ACI) diagnostic instrument is effective in the diagnosis of cardiac ischaemia. Other effective technologies include the Acute Cardiac Ischaemia-Time Insensitive Predictive Instrument (ACI-TIPI), the prehospital ECG, the Goldman chest pain protocol, and the ECG exercise test (Selker et al., 1997; DARE-985026, 2000) [**A**].

Definitions:

Levels of Evidence

A. Strong research-based evidence. Multiple relevant, high-quality scientific studies with homogenic results.
B. Moderate research-based evidence. At least one relevant, high-quality study or multiple adequate studies.
C. Limited research-based evidence. At least one adequate scientific study.
D. No research-based evidence. Expert panel evaluation of other information.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

Concise summaries of scientific evidence attached to the individual guidelines are the unique feature of the Evidence-Based Medicine Guidelines. The evidence summaries allow the clinician to judge how well-founded the treatment

recommendations are. The type of supporting evidence is identified and graded for select recommendations (see the "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate differential diagnosis of chest pain

POTENTIAL HARMS

Not stated

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Timeliness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

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ADAPTATION

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

DATE RELEASED

2001 May 4 (revised 2004 Sept 14)

GUIDELINE DEVELOPER(S)

Finnish Medical Society Duodecim - Professional Association

SOURCE(S) OF FUNDING

Finnish Medical Society Duodecim

GUIDELINE COMMITTEE

Editorial Team of EBM Guidelines

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Primary Author: Editors

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

Note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary.

GUIDELINE AVAILABILITY

This guideline is included in "EBM Guidelines. Evidence-Based Medicine" available from Duodecim Medical Publications, Ltd, PO Box 713, 00101 Helsinki, Finland; e-mail: info@ebm-guidelines.com; Web site: www.ebm-guidelines.com.

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on August 28, 2001. The information was verified by the guideline developer as of October 26, 2001. This summary was updated by ECRI on April 2, 2004, October 1, 2004, and most recently on February 21, 2005.

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