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1 Background information

Quick info:

Objective and purpose of the care map

The purpose of this care map is to define the appropriate diagnosis and management of stable angina in adults. The objective is to reduce inappropriate investigation, prescribing, and referral of patients presenting to provider organisations in Qatar.

Scope

Aspects of care covered within this care map include:

- Diagnosis, investigation, and management of stable angina in adults.
- Criteria for consideration of coronary revascularisation.
- Follow-up of patients with stable angina.

Aspects of care not covered within this care map are:

- Diagnosis and management of stable angina in children and pregnant women.
- Diagnosis and management of cardiac chest pain not caused by coronary artery disease.
- Diagnosis and management of non-cardiac chest pain.
- Management of acute coronary syndrome – see the 'Acute Coronary Syndrome' care map.
- Angina occurring early after initially successful CABG or percutaneous transluminal coronary angioplasty.

Definitions

Stable angina:

- Angina is a symptom of myocardial ischaemia.
- Typically presents with chest heaviness or tightness that is [1-3]:
  - Precipitated by exertion or emotional stress; and
  - Is relieved by rest or nitrates.
- Angina is usually caused by CAD [2].
- Angina is considered stable when [1,2,4]:
  - It is not a new symptom.
  - There is no deterioration in frequency, severity or duration of episodes.
  - It is predictable in onset, reproducible and relieved within a few minutes by rest or nitrates.
  - There is no recent myocardial damage.

Unstable angina [2]:

- A new onset of chest pain or discomfort, or
- Abrupt deterioration in previously stable angina.
- Frequent occurrences of chest pain or discomfort with little or no exertion.
- Episodes are often prolonged.

Myocardial infarction:

- Sudden insufficiency of the blood supply to the myocardium resulting in myocardial necrosis [5].
- Usually occurs as a result of thrombotic occlusion of a coronary artery and typically results in [2,4]:
  - Cardiac chest pain.
  - Raised biomarkers of myocardial damage.
  - Characteristic ECG changes:
    - ST-segment elevation or new-onset left bundle branch block.
    - ST-segment depression or T-wave inversion.

ACS:

- Is defined as a condition in which there is a coronary artery event with plaque rupture, erosion, or coronary dissection, resulting in the formation of intra-coronary thrombus [2].
- Includes the following [2,6]:
  - STEMI.
  - NSTEACS, which is comprised of:
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- Unstable angina.
- NSTEMI.

**Epidemiology**
In 2013, 12.9% of registered deaths in Qatar were related to ASCVD [7]:
- In the Qatari population, 12.2% of deaths were related to ASCVD.
- In the non-Qatari population, 13.2% of deaths were related to ASCVD.

The 2012 Qatar STEPwise survey showed the following prevalences for key ASCVD risk factors in the survey population [8]:
- Raised blood pressure in 32.9%:
  - Females – 37.7%.
  - Males – 28%.
- Raised total cholesterol in 21.9%:
  - Females – 24.6%.
  - Males – 19.1%.
- Raised blood glucose (blood glucose greater than or equal to 110 mg/dL) and a history of receiving medication for diabetes in 16.7%:
  - Males – 17.6%.
  - Females – 15.9%.
- Smoking in 16.4%:
  - Males – 31.9%.
  - Females – 1.2%.
- Low level of physical activity in 45.9%:
  - Females – 54.2%.
  - Males – 37.4%.
- Obesity (BMI $\geq$ 30 kg/m$^2$) in 41.4%:
  - Females – 43.2%.
  - Males – 39.5%.

**Risk factors**
The main risk factors for ASCVD are as follows [2,4,7,8]:
- Smoking.
- Hypertension.
- DM.
- Family history of premature CAD.
- Dyslipidaemia.
- Male sex.
- Increasing age.
- Obesity.
- Sedentary lifestyle.

References:
Please see the care map’s Provenance.

2 Updates to this care map

Quick info:
Date of publication: 19-Mar-2017
Please see the care map’s Provenance for additional information on references, contributors, and the editorial process.

3 Key recommendations of the care map
Quick info:
The key recommendations of this care map are:

**Referral for suspected ACS:**
- Refer patients to hospital as an emergency if ACS is suspected; or if any of the following are present [2]:
  - Prolonged or recurrent chest pain typical of ischaemia; or
  - Pain free, but the patient has had chest pain typical of ischaemia in the last 48 hours [R-GDG]; or
  - A resting 12-lead ECG indicates ischaemia; or
  - Signs of complications, e.g. pulmonary oedema.
- If the patient has been pain free for 48 hours or more and does not have any high risk features (e.g. presyncope, syncope, or heart failure symptoms), refer urgently for outpatient cardiology assessment [R-GDG].

**Assessing the pre-test probability of CAD** (see the 'Assessing the PTP of CAD' care point):
- Stepwise assessment of patients presenting with angina symptoms (who do not have a history of established ASCVD), is recommended to determine the most appropriate method of diagnostic evaluation [9].
- Assessment comprises of:
  - Clinical assessment.
  - Assessment of PTP of CAD.
  - Determining which investigations are required to confirm the diagnosis of CAD.

**Non-invasive stress testing** (see the 'Assessing the PTP of CAD' care point):
- Non-invasive stress testing is not routinely indicated in patients with a PTP of <15% [9].
- Patients who are deemed to have a PTP of between 15-85% should be investigated for CAD using a non-invasive stress test using one of the following tests [R-GDG]:
  - Stress echocardiography.
  - MPS with SPECT.
  - Perfusion CMR.
- Patients with a high PTP of >85% should be considered to have CAD and additional stress imaging will not add diagnostic value [9].
- If the patient declines stress imaging or is unsuitable, consider investigation using an exercise ECG [R-GDG].

**Further management and referral** (see the 'Further management and referral' care point):
- Patients diagnosed with CAD following investigation with stress imaging or those with a pre-test probability of >85% should be managed as having established CAD.
- Medical management should be optimised and patients should be risk-assessed in order to determine their probability of experiencing a cardiac event [9].
- Those deemed to be at medium or high risk of a cardiac event should be considered for invasive coronary angiography (see the 'Angiography and revascularisation' care point).

**Medical management** (see the 'Pharmacological management' care point in the 'Medical management' page):
- Sublingual GTN tablets or spray should be used for the immediate relief of angina and before performing activities that are known to precipitate angina [1,3]
- First line treatment for management of symptomatic stable angina includes either beta-blockers or calcium-channel blockers [14][L1, RGA1].
- If adequate control of anginal symptoms is not achieved with beta-blocker or calcium-channel blocker monotherapy, use the two in combination [1,3].

**Secondary prevention of ASCVD** (see the ‘Secondary prevention of ASCVD’ care point in the 'Medical management' page):
- Anti-thrombotic medication [2,9]:
  - All patients diagnosed with angina should receive long term therapy with aspirin.
- Blood pressure control [1,2,4,9].
- Lipid management [1,2,4,9,11].
- Diabetes control [9].
- Smoking [9]:
  - All smokers should be advised to quit and offered cessation assistance.
  - Physical activity and rehabilitation following treatment should be encouraged within exercise tolerances [9,16].
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- Attention should be given to diet and body weight [9]:
  - Obese patients should be assessed for sleep apnoea symptoms [9].

**Specialist management** (see the ‘Specialist management’ care point in the ‘Specialist management’ page):
- Outpatient referral to a cardiologist is indicated for the following patients [10]:
  - All patients with a new diagnosis of angina.
  - Patients with poorly controlled angina symptoms despite maximal treatment.
  - Patients requesting referral.
  - Patients with a significant co-morbidity which cannot otherwise be managed in primary care.

**Coronary angiography and revascularisation:**
- See the ‘Angiography and revascularisation’ care point in the ‘Specialist management’ page).

**Follow-up** (see the ‘Follow-up’ care point in the ‘Specialist management’ page):
- Long term follow-up in primary care setting is indicated in those with angina and confirmed CAD [2].

References:
Please see the care map's Provenance.

4 Abbreviations used in this care map

Quick info:
The abbreviations used in this care map are as follows:
ACE
Angiotensin-converting enzyme
ACS
Acute coronary syndrome
ASCVD
Atherosclerotic cardiovascular disease
BMI
Body mass index
BNP
Beta-natriuretic peptide
BP
Blood pressure
CAD
Coronary artery disease
CABG
Coronary artery bypass grafting
CBC
Complete blood count
CMR
Cardiac magnetic resonance
CVD
Cardiovascular disease
DM
Diabetes mellitus
ECG
Electrocardiogram
eGFR
Estimated glomerular filtration rate
GTN
Glyceryl trinitrate
HBA1c
Glycated haemoglobin
6 RED FLAG!

Quick info:
Refer patients to hospital as an emergency if ACS is suspected; or if any of the following are present [2]:

• Prolonged or recurrent chest pain typical of ischaemia; or
• Pain free, but the patient has had chest pain typical of ischaemia in the last 48 hours [R-GDG]; or
• A resting 12-lead ECG indicates ischaemia; or
• Signs of complications, e.g. pulmonary oedema.

If the patient has been pain free for 48 hours or more and does not have any high risk features (e.g. presyncope, syncope, or heart failure symptoms), refer urgently for outpatient cardiology assessment [R-GDG].

References:
Please see the care map's Provenance.

8 History

Quick info:
Take a detailed clinical history documenting:

• The characteristics of the pain, including [2]:
  • Location.
  • Radiation.
  • Severity.
  • Duration and frequency.
  • Factors that provoke and relieve the pain.
• Any associated symptoms, such as [2,9]:
  • Breathlessness.
  • Syncope.
  • Stability of symptoms, e.g. [2,9]:


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- Whether the chest pain follows a predictable pattern such as being exercise-induced,
- A new or deteriorating chest pain that may require urgent assessment.
- Any history of angina, MI, coronary revascularisation, or other CVD and any cardiovascular risk factors [2].
- Comorbidities [9].
- Quality of life of the patient [9].

References:
Please see the care map's Provenance.

9 Physical examination

Quick info:
Carry out a physical examination to:
- Identify risk factors for ASCVD [1,2,10,11]:
  - Measure body weight and height – this allows calculation of BMI.
  - Measure waist circumference.
  - Measure BP.
- Look for signs of hyperlipidaemia, e.g.:
  - Corneal arcus.
  - Xanthelasma.
  - Tendinous xanthomata.
- Examine for signs of non-atherosclerotic CVD [2]:
  - Aortic stenosis (ejection systolic murmur).
  - Arrhythmia.
  - Hypertrophic cardiomyopathy
- Examine for evidence of peripheral artery disease, e.g. absent foot pulses or bruits [10].
- Examine for non-cardiac causes of chest pain [2].

References:
Please see the care map's Provenance.

10 Differential diagnosis

Quick info:
Cardiac causes of chest pain include [1,2,9,12]:
- Unstable angina:
  - New onset of chest pain or discomfort, or sudden worsening of stable angina.
  - Occurs frequently and with little or no exertion.
  - Episodes often prolonged.
- Myocardial infarction.
- Valvular heart disease (e.g. aortic stenosis).
- Hypertrophic cardiomyopathy.
- Prinzmetal's (vasospastic) angina:
  - A rare form of angina in which pain is experienced at rest rather than during activity.
  - Spasm of proximal coronary arteries causes narrowing or occlusion.
  - During vasospasm ECG usually shows ST-elevation.
- Pericarditis.
Non-cardiac causes of chest pain include [2,4,10,13]:
- Aortic dissection.
- Pulmonary embolism.
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- Gastro-oesophageal reflux.
- Oesophageal dysmotility.
- Psychological causes, e.g.:
  - Anxiety.
  - Panic attacks.
  - Depression.
- Musculoskeletal pain, e.g.:
  - Costochondritis.
  - Referred pain from thoracic spine.
- Pleural pain, e.g.:
  - Pleural infection.
  - Pleural tumour.
  - Pneumothorax.
- Thyroid disorders.

Patients with proven cardiac chest pain can also experience non-cardiac chest pain, and they often interpret the non-cardiac pain as symptoms of heart disease. It is important to distinguish between the two causes early, in order to reduce levels of distress and avoid inappropriate treatments [R-GDG].

References:

Please see the care map's Provenance.

11 Diagnosis

Quick info:

A working diagnosis of angina can be made in primary care on the basis of clinical history, but further diagnostic assessment and risk stratification are needed, which require referral to a specialist [1].

Diagnose stable angina based on one of the following [2]:

- Clinical assessment alone; or
- Clinical assessment plus diagnostic testing, i.e. anatomical testing for obstructive CAD and/or functional testing for myocardial ischaemia.

Suspect angina in patients presenting with tight, dull, or heavy chest discomfort which is [1,2]:

- Retrosternal or left-sided, radiating to the left arm, neck, jaw, or back.
- Angina pain [1,2]:
  - Is predictable.
  - Is not fleeting in nature and usually lasts for longer than a minute.
  - Is not usually sharp or stabbing or influenced by respiration.
  - Subsides gradually.
- Associated with exertion or emotional stress and relieved within a few minutes by rest or GTN [2].
- Precipitated by cold weather or a meal [2].

Some patients may present with atypical symptoms, including [1,2,9,12]:

- Breathlessness.
- Nausea.
- Epigastric discomfort or burping.
- Atypical symptoms are particularly likely in:
  - Women.
  - Older people.
  - Those with DM.

Patients with a suspected angina are initially assessed in primary care. Following this assessment, diagnosis and severity of the condition should be confirmed in the chest pain evaluation service [1][L1, RGA2].

References:
Stable angina - suspected
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Please see the care map's Provenance.

13 Resting ECG

Quick info:
Resting ECG [9]:
• All patients should have a resting 12-lead ECG [9][L2, RGA2]:
  • A normal ECG does not exclude the diagnosis of ischaemia.
  • The ECG establishes a baseline for future comparisons.
  • May assist in clarifying differential diagnosis.
• The typical ECG changes consistent with ischaemia include [2]:
  • ST-segment deviation.
  • T-wave abnormalities.
  • New-onset or intermittent left bundle branch block.
  • Pathological Q waves.

References:
Please see the care map's Provenance.

14 Blood tests

Quick info:
Blood tests should include [2,9]:
• CBC.
• Serum creatinine and eGFR.
• Lipid profile.
• Fasting blood glucose and HBA\textsubscript{1C}.
• Thyroid function tests.
• Liver function tests.
• BNP – if heart failure is suspected.

References:
Please see the care map's Provenance.

15 Chest radiograph

Quick info:
Chest radiograph:
• A chest radiograph is recommended in patients with an atypical presentation of angina or suspicion of pulmonary disease [9] [L3, RGA2].
• Consider also in patients with suspected heart failure [9].

References:
Please see the care map's Provenance.

16 Assessing the PTP of CAD

Quick info:
Stepwise assessment of patients presenting with angina symptoms (who do not have a history of established ASCVD) is recommended to determine the most appropriate method of diagnostic evaluation [9].

Assessment comprises of the following steps [2,9]:


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- Determine clinically whether pain is typical angina, atypical angina, or non-anginal:
  - Patients with all of the following are determined to have typical angina:
    - Constricting discomfort in the anterior chest, neck, shoulders, jaw, or arms.
    - Pain is precipitated by physical exertion.
    - Pain is relieved by rest or GTN.
  - Patients with two of the above features are defined as having atypical angina.
  - Patients with one or none of the above features are defined as having non-anginal pain.
- Use the table below to determine the patient’s pre-test probability of having CAD.
- Determine which investigations are required to confirm the diagnosis of CAD.

The attached table has been adapted from the European Society of Cardiology Guidelines [9] for determining the clinical PTP of CAD in patients presenting with possible symptoms of angina.

References:
Please see the care map's Provenance.

17  PTP of >85%

Quick info:
Patients with a high PTP of >85% should be considered to have CAD, additional stress imaging does not add diagnostic value [9]. Patients should be considered for invasive coronary angiography if they are at high risk of experiencing a cardiac event and/or they experience severe angina at low levels of exercise.

References:
Please see the care map's Provenance.

18  PTP of 15-85%

Quick info:
Patients who are deemed to have a PTP of between 15-85% should be investigated for CAD using a non-invasive stress test [R-GDG].

Where available, one of the following tests may be used, in addition to stress induced by either exercise or pharmacological agents (typically dobutamine). Pharmacological agents may be used where exercise is not feasible or desirable [9]:
- Stress echocardiography.
- MPS with SPECT.
- Perfusion CMR.

If the patient declines stress imaging or is unsuitable, consider investigation using an exercise ECG [R-GDG].

References:
Please see the care map's Provenance.

19  PTP of <15%

Quick info:
Patients with a PTP of <15% should have other cardiac causes of chest pain excluded alongside modification of risk factors for ASCVD following assessment of their 10-year ASCVD risk. Non-invasive stress testing is not routinely indicated in these patients [9]. Patients with repeated attacks of chest pain occurring only at rest should be reviewed for possible vasospastic angina and investigated appropriately by a cardiology specialist [9].

References:
Please see the care map's Provenance.

20  Further management and referral

Quick info:
Patients diagnosed with CAD following investigation with stress imaging or those with a PTP of >85% should be managed as having established CAD. Medical management should be optimised and patients should be risk-assessed in order to determine their probability of experiencing a cardiac event [9].
Those deemed to be at medium or high risk of a cardiac event should be considered for invasive coronary angiography (see the 'Angiography and revascularisation' care point in the 'Specialist care' page).

References:
Please see the care map's Provenance.

21 Consider referral to a cardiologist

Quick info:
Outpatient referral to a cardiologist is indicated for the following patients [10]:
- All patients with a new diagnosis of angina.
- Patients with poorly controlled angina symptoms despite maximal treatment.
- Patients requesting referral.
- Patients with a significant co-morbidity that cannot otherwise be managed in primary care.

References:
Please see the care map's Provenance.
Stable angina

Provenance Certificate

Overview

This guideline document has been developed and issued by the Ministry of Public Health of Qatar (MOPH), through a process which aligns with international best practice in guideline development and localisation. The guideline will be reviewed on a regular basis and updated to incorporate comments and feedback from stakeholders across Qatar.

Whilst the MOPH has sponsored the development of the care map, the MOPH has not influenced the specific recommendations made within it.

This care map was approved on 19 Mar 2017.

For information on changes in the last update, see the information point entitled 'Updates to this care map' on each page of the care map.

Editorial approach

This care map has been developed and issued by the Ministry of Public Health of Qatar (MOPH), through a process which aligns with international best practice in guideline development and localisation. The care map will be reviewed on a regular basis and updated to incorporate comments and feedback from stakeholders across Qatar.

The editorial methodology, used to develop this care map, has involved the following critical steps:

- Extensive literature search for well reputed published evidence relating to the topic.
- Critical appraisal of the literature.
- Development of a draft summary guideline.
- Review of the summary guideline with a Guideline Development Group, comprised of practising physicians and subject matter experts from across provider organisations in Qatar.
- Independent review of the guideline by the Clinical Governance body appointed by the MOPH, from amongst stakeholder organisations across Qatar.

Explicit review of the care map by patient groups was not undertaken.

Whilst the MOPH has sponsored the development of the care map, the MOPH has not influenced the specific recommendations made within it.

Sources of evidence

The professional literature published in the English language has been systematically queried using specially developed, customised, and tested search strings. Search strategies are developed to allow efficient yet comprehensive analysis of relevant publications for a given topic and to maximise retrieval of articles with certain desired characteristics pertinent to a guideline.

For each guideline, all retrieved publications have been individually reviewed by a clinical editor and assessed in terms of quality, utility, and relevance. Preference is given to publications that:

1. Are designed with rigorous scientific methodology.
2. Are published in higher-quality journals (i.e. journals that are read and cited most often within their field).
3. Address an aspect of specific importance to the guideline in question.
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Where included, the ‘goal length of stay’ stated within this guideline is supported by and validated through utilisation analysis of various international health insurance databases. The purpose of database analysis is to confirm the reasonability and clinical appropriateness of the goal, as an achievable benchmark for optimal duration of inpatient admission.

Evidence grading and recommendations

Recommendations made within this guideline are supported by evidence from the medical literature and where possible the most authoritative sources have been used in the development of this guideline. In order to provide insight into the evidence basis for each recommendation, the following evidence hierarchy has been used to grade the level of authoritiveness of the evidence used, where recommendations have been made within this guideline.

Where the recommendations of international guidelines have been adopted, the evidence grading is assigned to the underlying evidence used by the international guideline. Where more than one source has been cited, the evidence grading relates to the highest level of evidence cited:

- **Level 1 (L1):**
  - Meta-analyses.
  - Randomised controlled trials with meta-analysis.
  - Randomised controlled trials.
  - Systematic reviews.

- **Level 2 (L2):**
  - Observational studies, examples include:
    - Cohort studies with statistical adjustment for potential confounders.
    - Cohort studies without adjustment.
    - Case series with historical or literature controls.
    - Uncontrolled case series.
  - Statements in published articles or textbooks.

- **Level 3 (L3):**
  - Expert opinion.
  - Unpublished data, examples include:
    - Large database analyses.
    - Written protocols or outcomes reports from large practices.

In order to give additional insight into the reasoning underlying certain recommendations and the strength of recommendation, the following recommendation grading has been used, where recommendations are made:

- **Recommendation Grade A1 (RGA1):** Evidence demonstrates at least moderate certainty of at least moderate net benefit.
- **Recommendation Grade A2 (RGA2):** Evidence demonstrates a net benefit, but of less than moderate certainty, and may consist of a consensus opinion of experts, case studies, and common standard care.
- **Recommendation Grade B (RGB):** Evidence is insufficient, conflicting, or poor and demonstrates an incomplete assessment of net benefit vs harm; additional research is recommended.
- **Recommendation Grade C1 (RGC1):** Evidence demonstrates a lack of net benefit; additional research is recommended.
- **Recommendation Grade C2 (RGC2):** Evidence demonstrates potential harm that outweighs benefit; additional research is recommended.
- **Recommendation of the GDG (R-GDG):** Recommended best practice on the basis of the clinical experience of the Guideline Development Group members.
Stable angina

References


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Guideline Development Group members

The following table lists members of the Guideline Development Group (GDG) nominated by their respective organisations and the Clinical Governance Group. The GDG members have reviewed and provided feedback on the draft guideline relating to the topic. Each member has completed a declaration of conflicts of interest, which has been reviewed and retained by the MOPH.

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Organisation</th>
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Responsibilities of healthcare professionals

This care map has been issued by the MOPH to define how care should be provided in Qatar. It is based upon a comprehensive assessment of the evidence as well as its applicability to the national context of Qatar. Healthcare professionals are expected to take this guidance into account when exercising their clinical judgement in the care of patients presenting to them.

The guidance does not override individual professional responsibility to take decisions which are appropriate to the circumstances of the patient concerned. Such decisions should be made in consultation with the patient, their guardians, or carers and should consider the individual risks and benefits of any intervention that is contemplated in the patient’s care.

Acknowledgements

The following individuals are recognised for their contribution to the successful implementation of the National Guidelines project.

Healthcare Quality Management and Patient Safety Department of the MOPH:

- Ms Huda Amer Al-Katheeri, Acting Director & Project Executive.
- Dr Alanoud Saleh Alfehaidi, Guideline & Standardisation Specialist.
- Dr Ilham Omer Siddig, Guideline & Standardisation Specialist.
- Ms Maricel Balagtas Garcia, Guideline Standardisation Coordinator.
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Hearst Health International:

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- Dr Amy Glossop, Clinical Editor.
- Dr Zara Quail, Clinical Editor.
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