GUIDELINES

Assessment of recent onset chest pain or discomfort of suspected cardiac origin: summary of NICE guidance

Angela Cooper,[1] Adam Timmis,[2] Jane Skinner,[3] on behalf of the Guideline Development Group

[1]National Clinical Guideline Centre, Royal College of Physicians of London, London NW1 4LE
[2]Barts and the London Queen Mary's School of Medicine and Dentistry, London E1 2AD
[3]Department of Cardiology, Royal Victoria Infirmary, Newcastle upon Tyne NE1 4LP
Correspondence to: A Cooper
angela.cooper@rcplondon.ac.uk

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This is one of a series of *BMJ* summaries of new guidelines based on the best available evidence; they highlight important recommendations for clinical practice, especially where uncertainty or controversy exists.

Further information about the guidance, a list of members of the guideline development group, and the supporting evidence statements are in the full version on bmj.com.

Why read this summary?

Chest pain is very common, and in the United Kingdom about 1% of visits to a general practitioner, 5% of visits to the emergency department, and 25% of emergency hospital admissions are for this symptom.[1] Chest pain has many causes, and when the cause could be cardiac in origin, appropriate and timely assessment and diagnostic investigation are needed. This article summarises the most recent recommendations from the National Institute for Health and Clinical Excellence (NICE) on the assessment and diagnosis of recent onset chest pain or discomfort of suspected cardiac origin.[2]

Recommendations

NICE recommendations are based on systematic reviews of best available evidence and explicit consideration of cost effectiveness. When minimal evidence is available, recommendations are based on the experience and opinion of the Guideline Development Group (GDG) on what constitutes good practice. Evidence levels for the recommendations are in the full version of this article on bmj.com.

Two separate diagnostic pathways are presented. The first is for people with acute chest pain in whom an acute coronary syndrome is suspected. The second is for people with intermittent stable chest pain in whom stable angina is suspected.

Acute chest pain and suspected acute coronary syndrome

Initial clinical assessment and referral to hospital

- Consider the history of chest pain, the presence of cardiovascular risk factors, history of ischaemic heart disease, and any previous investigations.
- Assess for any of the following symptoms, which may indicate an acute coronary syndrome:
  - Pain in the chest or other areas that lasts longer than 15 minutes
  - Chest pain associated with nausea and vomiting, marked sweating, breathlessness, or a combination of these
  - Chest pain associated with haemodynamic instability
  - New onset chest pain, or abrupt deterioration in previously stable angina, with frequent recurrent pain that occurs with little or no exertion and often lasts longer than 15 minutes.
- Do not assess symptoms of an acute coronary syndrome differently in men and women and different ethnic groups.
- Do not use people's response to glyceryl trinitrate to make a diagnosis.
- If an acute coronary syndrome is suspected, referral to hospital may be necessary (table 1).

Immediate management of suspected acute coronary syndrome

- Offer pain relief with glyceryl trinitrate (sublingual or buccal) or intravenous opioids, or both. Consider a single loading dose of 300 mg aspirin.
- Do not routinely administer oxygen. Offer supplemental oxygen only according to British Thoracic Society guidelines.[3]

Resting 12 lead ECG and hospital assessment for people with suspected acute coronary syndrome

- Perform resting 12 lead electrocardiography (ECG) as soon as possible. If in the community setting send the results to hospital, but do not delay transfer to hospital.
- Measure troponin I or troponin T on arrival at hospital and repeat 10-12 hours after onset of symptoms. Interpretation of troponin

Table 1 | Referral to hospital if an acute coronary syndrome is suspected

Symptoms	Type of referral recommended
Patient has chest pain or is currently pain free but has had chest pain in the past 12 hours and a resting 12 lead ECG is abnormal or not available	Emergency referral to hospital
Patient has recently had acute coronary syndrome (confirmed or suspected) and has developed further chest pain	Emergency referral to hospital
Patient is pain free, but has had chest pain in the past 12 hours with a normal ECG or has had chest pain in the past 12-72 hours	Urgent same day assessment in hospital
Chest pain has resolved but the patient has signs of complications, such as pulmonary oedema or haemodynamic instability	Patient needs assessment in hospital. Use clinical judgment to determine if this is as an emergency or for same day urgent assessment
Last episode of chest pain was more than 72 hours ago and the patient has no signs of complications	Perform clinical assessment, confirm diagnosis by resting 12 lead ECG and measurement of blood troponin

ECG=electrocardiography.

concentrations should take into account the clinical presentation, time of onset of symptoms, and the findings on resting ECG.
- In people with relevant new ST-T wave ECG changes follow appropriate guidance[4] or local protocols for ST elevation myocardial infarction until a firm diagnosis is reached.
- Suspect an acute coronary syndrome if other changes, such as Q waves and T wave changes, are seen on ECG, even if no ST segment changes are seen.
- Do not exclude an acute coronary syndrome if the resting ECG is normal.
- When the cause of chest pain is uncertain, continue to monitor clinical and ECG parameters until a firm diagnosis is made.

Making a diagnosis
- Diagnose acute myocardial infarction according to the universal definition of myocardial infarction,[5] and follow appropriate guidance when the diagnosis is made[4] or local protocols for ST elevation myocardial infarction. (A summary of the universal definition of myocardial infarction is available at the end of the extended version of this article on bmj.com.)
- If troponin concentrations are raised, reassess to exclude other causes (such as myocarditis, aortic dissection, or pulmonary embolism) before confirming an acute coronary syndrome.
- Reassess people without raised troponin concentrations who have no changes on resting ECG. If myocardial ischaemia is suspected, follow recommendations on stable chest pain, using clinical judgment to decide on the timing of further diagnostic investigations.

Stable chest pain and suspected angina

Clinical assessment
- Determine the age and sex of the person, characteristics of the chest pain, any history of coronary artery disease or other vascular disease, and cardiovascular risk factors. Carry out a physical examination, including identification of non-coronary causes of angina. Do not assess symptoms differently in men and women and different ethnic groups.

Diagnosis based on clinical assessment
- Use clinical assessment and the typicality of the features of anginal pain to estimate the likelihood of coronary artery disease (table 2).
- Further diagnostic investigation is unnecessary for typical angina pain if the estimated likelihood of coronary artery disease is greater than 90%. Manage as angina.
- If the estimated likelihood of coronary artery disease is less than 10% first consider causes other than angina.
- Exclude a diagnosis of angina if pain is non-anginal unless suspicion is raised on the basis of other aspects of the assessment.

Diagnosis based on clinical assessment and investigations
- If angina cannot be diagnosed or excluded on the basis of the clinical assessment alone, take a resting 12 lead ECG. Pathological Q waves, left bundle branch block, ST segment abnormalities, and T wave abnormalities may indicate ischaemia or previous myocardial infarction.
- Do not rule out a diagnosis of angina on the basis of a normal resting ECG.
- Take the clinical assessment and the resting ECG into account when estimating the likelihood of coronary artery disease (table 2). Arrange further diagnostic testing as indicated in the box.
- Offer invasive coronary angiography when the results of non-invasive functional imaging are inconclusive.
- Offer non-invasive functional imaging for myocardial ischaemia if invasive coronary angiography or 64 slice (or above) computed tomography coronary angiography has shown coronary artery disease of uncertain functional relevance.
- Offer non-invasive functional testing for people with known coronary artery disease in whom angina cannot be diagnosed or excluded on the basis of clinical assessment alone.
- Do not use magnetic resonance coronary angiography for diagnosing angina.
- Do not use exercise ECG to diagnose or exclude angina for people without known coronary artery disease.
- Offer information about the risks associated with any radiation exposure during diagnostic testing.

Making a diagnosis after investigations

Confirm a diagnosis of angina if one or both of the following are true:
- Significant coronary artery disease is found

Table 2 | Percentage* of people estimated to have coronary artery disease according to typicality† of symptoms, age, sex, and risk factors[6]

	Non-anginal chest pain‡				Atypical angina				Typical angina			
Age	Men		Women		Men		Women		Men		Women	
(years)	L§	H¶	L	H	L	H	L	H	L	H	L	H
35	3	35	1	19	8	59	2	39	30	88	10	78
45	9	47	2	22	21	70	5	43	51	92	20	79
55	23	59	4	25	45	79	10	47	80	95	38	82
65**	49	69	9	29	71	86	20	51	93	97	56	84

*Values are proportion of people at each mid-decade age with significant coronary artery disease.

†Typical angina pain is: constricting discomfort in the front of the chest, or in the neck shoulders, jaw, or arms, which is precipitated by physical exertion and relieved by rest or glyceryl trinitrate within about 5 minutes. Atypical angina pain has two of the features of typical angina. Non-angina pain has none or one of the features of typical angina pain.

‡People with symptoms of non-anginal chest pain would not be investigated for stable angina routinely.

§Low risk: have none of the risk factors included in the high risk group.

¶High risk: have the following risk factors—diabetes, smoking, and hyperlipidaemia (total cholesterol >6.47 mmol/l).

**For men older than 70 with atypical or typical symptoms, assume an estimate >90%. For women older than 70, assume an estimate of 61-90%, except for those at high risk who also have typical symptoms, in whom a risk of >90% should be assumed.

These results probably overestimate coronary artery disease in primary care populations.

In the presence of ST-T changes or Q waves on resting electrocardiography, the likelihood of coronary artery disease is higher than shown.

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- When to suspect child maltreatment (2009;339:b2689)
- Early management of persistent non-specific low back pain (2009;338:b1805)
- Recognition and assessment of coeliac disease in children and adults (2009;338:b1684)

during invasive or 64 slice (or more) computed tomography coronary angiography
- Reversible myocardial ischaemia is found during non-invasive functional imaging.

Overcoming barriers

This guideline will enhance the understanding of the clinical assessment and investigation of patients with suspected acute coronary syndrome. Healthcare professionals should particularly note the recommendations for the urgency of referral for hospital assessment and the timing of diagnostic testing and ensure these can be implemented. In patients with suspected stable angina, the guideline emphasises the importance of a detailed clinical history to inform an initial triage of whether pain might be cardiac in origin, and mechanisms should be in place to ensure that this is accurately recorded. In patients with non-anginal pain, further diagnostic testing is not generally recommended. In patients with symptoms of typical or atypical angina who require further diagnostic testing, the estimated likelihood of coronary artery disease will determine which tests to use. Healthcare providers should ensure appropriate and timely access to high quality diagnostic testing and interpretation and have systems in place to audit their use.

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EASILY MISSED?

Lichen sclerosus

Kate Dalziel,[1] Sarah Shaw[2]

[1]Royal Cornwall Hospital, Truro TR1 3LJ
[2]Stennack Surgery, St Ives
Correspondence to: K Dalziel
kate.dalziel@rcht.cornwall.nhs.uk

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This is a series of occasional articles highlighting conditions that may be commoner than many doctors realise or may be missed at first presentation. The series advisers are Anthony Harnden, university lecturer in general practice, Department of Primary Health Care, University of Oxford, and Richard Lehman, general practitioner, Banbury. If you would like to suggest a topic for this series please email us (easilymissed.bmj@bmjgroup.com).

Lichen sclerosus is a chronic inflammatory skin disease usually involving the anogenital skin. It is most common in postmenopausal women but occurs in both sexes at all ages.[1] The cause is unknown, but lichen sclerosus is strongly associated with autoimmune disorders, particularly thyroid disease, in almost 30% of patients.[2]

Why is it missed?

Lack of familiarity with the condition and failure to examine the genital skin properly can lead to long delays in diagnosis. Reticence and embarrassment on the part of patient and doctor may hinder the taking of a full history and examination. Common mistaken diagnoses in women are candida infection and postmenopausal vulval atrophy. Candida vulvovaginitis is usually confined to women of childbearing years[5] and is unusual in older women unless there are additional risk factors such as diabetes. The delay to diagnosis in one case series of 327 female patients was 2.2 years in children and 5.3 years in adults.[6]

Lack of familiarity with the condition probably explains why lichen sclerosus is rarely diagnosed as a cause of severe constipation in girls.[7] Terminology has been confusing in the past, when terms such as vulval dystrophy and balanitis xerotica obliterans have been used instead

CASE SCENARIO

An 89 year old woman presents with severe vulval itch that wakes her at night. She had previously been prescribed topical clotrimazole cream and subsequently oestrogen cream with no response.

Examination shows white plaques, areas of purpura, and excoriation of the skin around the vulva and perianal region. You suspect lichen sclerosus and refer her to the vulval clinic. You also prescribe a moderately potent topical steroid and an emollient and check her thyroid function. At the vulval clinic a diagnosis of vulval lichen sclerosus with scarring is confirmed by vulval biopsy, and very potent topical steroids are prescribed, with excellent clinical response.

HOW COMMON IS LICHEN SCLEROSUS?

No good prevalence data exist for lichen sclerosus in either sex

Lichen sclerosus is one of the most frequently seen conditions in vulval clinics.[1] It is the commonest underlying skin disease in elderly women presenting with squamous carcinoma of the vulva[3]

It has been found in 60% of boys requiring circumcision for acquired phimosis[4]

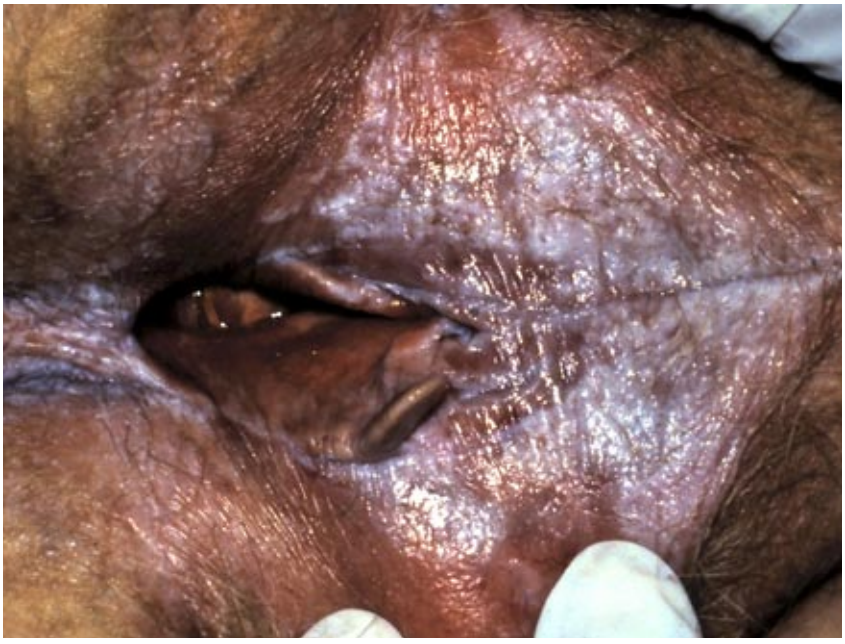

Fig 1 | Vulval lichen sclerosus showing white plaques and scarring with loss of the labia minora

of lichen sclerosus. The introduction of internationally agreed terminology[8] and the advent of multidisciplinary vulval clinics have improved the recognition of lichen sclerosus and the use of correct nomenclature.

Why does this matter?

Lichen sclerosus is highly symptomatic. Vulval, penile, and perianal disease can cause severe intractable itching and soreness. Scarring may follow, leading to loss of vulval anatomy (fig 1), clitoral phimosis, and vulval stenosis in women.[1] Sexual function may be severely impaired.[9] Phimosis and anterior urethral obstruction can occur in men and boys. The development of squamous cell carcinoma on genital lichen sclerosus is a well recognised complication in both sexes and is estimated to occur in about 5% of women. Sexual abuse is sometimes suspected in children with lichen sclerosus and, although the condition does not exclude abuse, which must always be considered, this has led to mistaken diagnosis.[10]

How is it diagnosed?

Clinical features

Adult women

The commonest presenting symptom of lichen sclerosus is severe vulval itching, and many patients will already have self medicated with over the counter anticandidal or anti-itch creams. Typical changes of lichen sclerosus include areas of white skin that may be small and numerous or confluent over larger areas affecting the labia minora, labia majora, and adjacent skin of the perineum and groin creases. Perianal disease is common, giving a "figure of eight" pattern of affected skin around the vulva and perianal region. The white skin often looks thin, wrinkled and fragile, with red or purple areas of bleeding into the skin. Excoriations are common. Sometimes there are thickened plaques or even warty areas. In a series of 253 women with lichen sclerosus, 177 had atrophic change and 94 had hyperkeratotic (warty) areas.[6]

In the patients with scarring (about 70% of women)[6] symptoms can include difficulty in passing urine, especially in men, and in women, dyspareunia, apareunia and splitting of the skin on attempted intercourse. Women may notice the change in their vulva with loss of the labia minora (fig 1) and fusion of the labia over the clitoris. Occasionally the first presentation of lichen sclerosus will be when squamous carcinoma develops: a plaque, ulcer or nodule can arise and enlarge very quickly, sometimes in a matter of weeks.

Adult men

Itching and soreness of the glans and prepuce are common. White areas and purpura can be seen on the glans and foreskin but may be hidden by a tight phimosis (fig 2). Squamous cell carcinoma can arise in the affected area, with features similar to those described above for women.

Children

Prepubertal girls with lichen sclerosus often present with vulval and perianal itching and show the typical skin changes as described for adult women, but they may also present with intractable constipation, soiling, anal fissures, and bleeding. Boys tend to present with phimosis, and this may hide the typical skin changes.

Differential diagnosis

Other chronic itchy skin diseases need to be considered. Various types of eczema that affect the perineal and perianal areas, such as contact dermatitis and seborrhoeic eczema, are common. Another auto-immune skin condition, lichen planus, can also show a predilection for genital skin. It too may cause scarring and squamous carcinoma. Plaques of vulval intraepithelial neoplasia may be white, but the other typical features of lichen sclerosus will be absent.

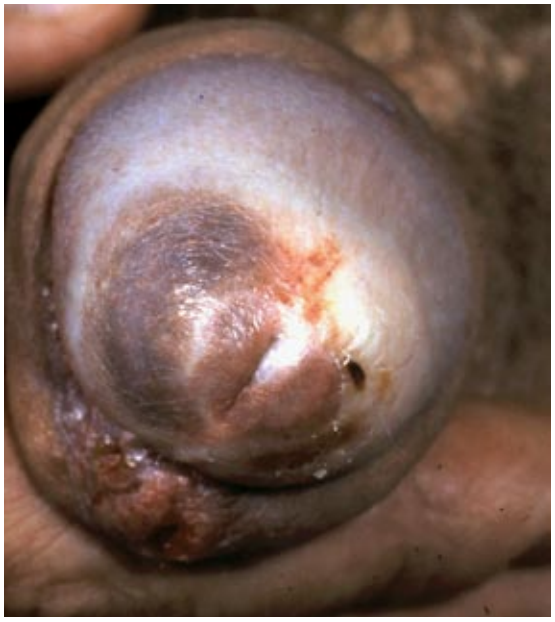

Fig 2 | Lichen sclerosus of glans penis in adult showing whiteness and purpura

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"There is another fact that may be easily missed when visiting a patient affected by LS, ie, the possibility that LS may involve also extragenital sites. Extragenital involvement may in fact be even more easily missed since these lesions are generally not symptomatic, unlike the genital ones."

Samuele Naviglio in a rapid response. To read all rapid responses or to send a response, visit bmj.com

KEY POINTS

- Always examine postmenopausal women with vulval itching for lichen sclerosus and other itchy skin disorders
- Consider lichen sclerosus in girls with severe constipation and in boys with phimosis
- Lichen sclerosus is often diagnosed by the clinical appearance, but if uncertainty exists then it is essential that a biopsy is done before very potent topical steroids are used
- Check thyroid function, and remember that a patient with lichen sclerosus is also more likely to have other autoimmune disorders
- Consider using topical steroids to treat phimosis caused by lichen sclerosus as this may avoid the need for circumcision
- Advise patients about the small (5%) risk of malignant change and to report immediately any change, such as an ulcer or lump

Investigations

No diagnostic biochemical or immunological investigations exist, but a skin biopsy will often provide the diagnosis. The histology of lichen sclerosus is distinctive, and biopsy will help to differentiate it from other skin diseases that cause anogenital itching and scarring. However, use of a very potent topical steroid (such as clobetasol propionate) may completely correct the clinical and histological changes, so such a steroid must not be used before a definitive diagnosis is made. Accurate diagnosis is important because patients with lichen sclerosus will need follow-up and education about ongoing treatment and the risk of cancer development.

Check thyroid function in all adult patients with lichen sclerosus, given the association with autoimmune thyroid disease.

How is it managed?

Evidence based guidelines for the management of lichen sclerosus state that if clinical doubt exists then a biopsy should be performed to confirm the diagnosis.[11] The general practitioner may wish to refer the patient to a specialist with an interest in vulval disease or to an established vulval clinic (based in dermatology, genitourinary medicine, or gynaecology departments). Pending the definitive diagnosis, emollients can be used as soap substitutes and to help repair the skin barrier, and a moderate potency topical steroid such as clobetasol butyrate ointment can be used sparingly. After diagnosis, the accepted treatment is with the very potent topical steroid clobetasol propionate ointment.[11] No controlled trials have been published to establish the best regime, but the guidelines suggest a single application at night for four weeks followed by alternate nights for four weeks and then twice a week for four weeks. Once symptoms are well controlled, the steroid ointment is used as required. Some patients will achieve complete remission; others will require ongoing treatment. In women, surgery is reserved for correcting the effects of scarring and for removal of cancer. Surgery is not otherwise appropriate for benign disease as it is mutilating and there is rapid relapse of the lichen sclerosus.

In men, circumcision may sometimes be needed for phimosis. However, treatment with a very potent topical steroid may avoid the need for circumcision in both men[12] and boys.[13] In children, if the diagnosis is not certain then referral to a specialist is indicated rather than attempting a biopsy.

Useful support and advice for patients can be found on the National Lichen Sclerosus Support Group's website www.lichensclerosus.org.

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Always take a careful history

Unusually for Lyme Regis, on England's south coast, there had been a severe episode of heavy snow that lasted for several days and I was snowbound at home. I lived a mile or so from the town centre, and my practice, at the top of a steep hill. Everything was at a standstill, and I could not get my car on the road.

On the third day I was surprised to see that the milkman had arrived. He had managed to obtain chains to fix to the wheels of his van. He told me of the difficulties he had encountered on his round and mentioned that "poor old Mrs Jones has bad water trouble." She was one of my patients, so I donned suitable clothing and boots, grabbed my medical case, and trudged and slithered the mile down hill in a blizzard to poor old Mrs Jones's house.

On my arrival, Mrs Jones welcomed me with great surprise: "Fancy you turning out on a day like this, doctor. Do come in from the cold." I explained that the milkman had advised me of her water trouble. She nodded and pointed up to the ceiling, where a large patch of damp was to be seen. However, the plumber was on his way, so I commiserated, and we had a cup of tea and a chat. I then trudged back up the hill, treating some children on the way by joining in with a snowball fight.

Alexander Fernandez retired general practitioner, Lyme Regis alexfernandez33@hotmail.com

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