NICE National Institute for Health and Care Excellence

NICE guideline

Subarachnoid haemorrhage caused by a ruptured aneurysm: diagnosis and management

NICE guideline

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Your responsibility

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

All problems (adverse events) related to a medicine or medical device used for treatment or in a procedure should be reported to the Medicines and Healthcare products Regulatory Agency using the Yellow Card Scheme.

Local commissioners and providers of healthcare have a responsibility to enable the guideline to be applied when individual professionals and people using services wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with complying with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

Contents

Overview

This guideline covers diagnosing and treating an aneurysmal (caused by a ruptured aneurysm) subarachnoid haemorrhage and its complications. It provides recommendations to improve diagnosis and ensure that the most effective treatments are offered. It includes guidance on follow-up care and information for people (aged 16 and over) who have had an aneurysmal subarachnoid haemorrhage, their families and carers.

Who is it for?

- Healthcare professionals
- Commissioners and providers of healthcare services for people with a suspected or confirmed subarachnoid haemorrhage caused by a ruptured aneurysm
- People with an aneurysmal subarachnoid haemorrhage, their families and carers

Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in NICE's information on making decisions about your care.

Making decisions using NICE guidelines explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

1.1 Assessment and diagnosis

NICE has also produced a visual summary of the recommendations on diagnosis.

Assessment and referral for diagnostic investigations

Initial assessment

1.1.1 Be aware that urgent investigation to confirm a diagnosis of subarachnoid haemorrhage facilitates early treatment to prevent rebleeding from a ruptured aneurysm and minimises disability and death.

1.1.2 When carrying out an initial assessment in a person who presents with unexplained acute severe headache:

- have a high index of suspicion for subarachnoid haemorrhage
- take a careful history to establish the rate of onset and time to peak intensity of the headache.

1.1.3 Bear in mind that:

- A 'thunderclap' headache (a sudden severe headache, typically peaking in

intensity within 1 to 5 minutes) is a red-flag symptom of subarachnoid haemorrhage.

- Thunderclap headache is associated with other conditions or causes such as migraine, cough, coitus or exertion. Most people with a thunderclap headache do not have a subarachnoid haemorrhage, but this should not deter further investigation if subarachnoid haemorrhage is suspected.
- People with subarachnoid haemorrhage can present with a range of non-specific symptoms and signs and are at greater risk of a diagnosis being missed. Other symptoms and signs of subarachnoid haemorrhage include, but are not limited to:
  - neck pain or stiffness
  - photophobia
  - nausea and vomiting
  - new symptoms or signs of altered brain function (such as reduced consciousness, seizure or focal neurological deficit)
  - limited or painful neck flexion on examination.

1.1.4 If a person with a possible subarachnoid haemorrhage finds it difficult to describe their symptoms, for example because of a learning disability, language problem or altered consciousness, ask anyone who witnessed the onset of symptoms for a description (without delaying referral).

1.1.5 Refer people with suspected subarachnoid haemorrhage seen outside of acute hospital settings to an emergency department immediately for further assessment.

1.1.6 Ensure that people with suspected subarachnoid haemorrhage seen in acute hospital settings such as emergency departments are reviewed urgently by a senior clinical decision-maker to assess the person and think about alternative diagnoses.

1.1.7 Refer the person for an urgent non-contrast CT head scan if review in secondary

care by a senior clinical decision-maker confirms unexplained thunderclap headache, or other signs and symptoms that suggest subarachnoid haemorrhage. Be aware that the diagnostic accuracy of CT head scans is highest within 6 hours of symptom onset.

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on assessment and referral for diagnostic investigations.

Full details of the evidence and the committee's discussion are in evidence review A: symptoms and signs and evidence review B: diagnostic accuracy of investigations.

Pain relief and neurological assessment

1.1.8 Ensure that people with a suspected or confirmed subarachnoid haemorrhage are given effective pain relief, including opioid analgesia if needed. Document administration of opioid analgesia in the person's healthcare record.

1.1.9 When conducting a neurological assessment, check the person's care record and if opioid analgesia has been given, take into account its sedating and pupillary effects.

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on pain relief and neurological assessment.

Full details of the evidence and the committee's discussion are in evidence review D: medical management strategies.

Diagnosing a subarachnoid haemorrhage

1.1.10 Diagnose a subarachnoid haemorrhage if the non-contrast CT head scan shows blood in the subarachnoid space.

1.1.11 If a CT head scan done within 6 hours of symptom onset and reported and documented by a radiologist shows no evidence of a subarachnoid haemorrhage:

- do not routinely offer a lumbar puncture
- think about alternative diagnoses and discuss with a senior clinical decision-maker
- seek advice from a specialist.

1.1.12 If a CT head scan done more than 6 hours after symptom onset shows no evidence of a subarachnoid haemorrhage, consider a lumbar puncture.

1.1.13 Allow at least 12 hours after symptom onset before doing a lumbar puncture to diagnose a subarachnoid haemorrhage.

1.1.14 Diagnose a subarachnoid haemorrhage if the lumbar puncture sample shows evidence of elevated bilirubin (xanthochromia) on spectrophotometry.

1.1.15 Think about alternative diagnoses if the lumbar puncture sample shows no evidence of elevated bilirubin (xanthochromia) on spectrophotometry.

Referral and transfer to a specialist neurosurgical centre

1.1.16 Urgently discuss with a specialist neurosurgical centre the need for transfer of care of a person with a diagnosis of subarachnoid haemorrhage to a specialist neurosurgical centre.

1.1.17 Do not use a subarachnoid haemorrhage severity score in isolation to determine the need for, or timing of, transfer of care to a specialist neurosurgical centre. Be aware that the risk of rebleeding is highest within 24 hours of the onset of symptoms.

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on diagnosing a subarachnoid haemorrhage.

Full details of the evidence and the committee's discussion are in evidence review B: diagnostic accuracy of investigations and evidence review C: severity scoring systems.

Detecting an aneurysm

1.1.18 Offer CT angiography of the head without delay to people with a confirmed diagnosis of subarachnoid haemorrhage to identify the cause of the bleeding and to guide treatment.

1.1.19 Diagnose an aneurysmal subarachnoid haemorrhage if:

- CT angiography of the head shows an intracranial arterial aneurysm **and**
- the pattern of subarachnoid blood is compatible with aneurysm rupture.

1.1.20 Seek specialist opinion without delay from an interventional neuroradiologist and neurosurgeon if:

- CT angiography of the head shows an intracranial arterial aneurysm **and**
- the pattern of subarachnoid blood is not compatible with aneurysm rupture.

1.1.21 If CT angiography of the head does not identify the cause of the subarachnoid haemorrhage and an aneurysm is still suspected, consider digital subtraction angiography (DSA), or magnetic resonance angiography (MRA) if DSA is contraindicated.

1.1.22 Diagnose an aneurysmal subarachnoid haemorrhage if:

- DSA or MRA shows an intracranial arterial aneurysm **and**
- the pattern of subarachnoid blood is compatible with aneurysm rupture.

1.1.23 Think about other diagnoses if DSA or MRA does not show an intracranial arterial aneurysm.

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on detecting an aneurysm.

Full details of the evidence and the committee's discussion are in evidence review K: diagnostic imaging strategies.

1.2 Managing a confirmed aneurysmal subarachnoid haemorrhage

Medical management

Nimodipine

1.2.1 Consider enteral nimodipine for people with a confirmed subarachnoid haemorrhage.

1.2.2 Only use intravenous nimodipine within a specialist setting and if enteral treatment is not suitable.

Reducing the risk of venous thromboembolism

1.2.3 Manage the risk of venous thromboembolism in people with an aneurysmal subarachnoid haemorrhage in line with the NICE guideline on venous thromboembolism in over 16s.

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on medical management.

Full details of the evidence and the committee's discussion are in evidence review D: medical management strategies.

Managing the culprit aneurysm

1.2.4 An interventional neuroradiologist and a neurosurgeon should discuss the options for managing the culprit aneurysm, taking into account the person's clinical condition, the characteristics of the aneurysm, and the amount and location of subarachnoid blood. They should document a proposed treatment plan based on the following options:

- endovascular coiling
- neurosurgical clipping
- no interventional procedure, with monitoring to check for clinical improvement and reassess the options for treatment.

1.2.5 Do not use a subarachnoid haemorrhage severity score in isolation to determine the suitability of any management option.

1.2.6 If interventional treatment to secure the aneurysm is an option, offer:

- endovascular coiling **or**
- neurosurgical clipping if endovascular coiling is not suitable.

1.2.7 Discuss the proposed treatment plan and any alternative options with the person, and their family or carers if appropriate, then agree and document a final treatment plan (see recommendations 1.5.5 to 1.5.7).

1.2.8 If interventional treatment is planned, ensure that it is carried out at the earliest opportunity to prevent rebleeding. Be aware that the risk of rebleeding is highest

within 24 hours of the onset of symptoms.

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on managing the culprit aneurysm.

Full details of the evidence and the committee's discussion are in evidence review L: interventions to prevent rebleeding, evidence review C: severity scoring systems and evidence review M: timing of interventions to prevent rebleeding.

Other NICE guidance on endovascular procedures for culprit aneurysms

- NICE interventional procedures guidance on endovascular insertion of an intrasaccular wire-mesh blood-flow disruption device for intracranial aneurysms
- NICE interventional procedures guidance on coil embolisation of ruptured intracranial aneurysms.

1.3 Monitoring and managing complications

Monitoring and investigating for deterioration

Transcranial doppler monitoring for deterioration

1.3.1 Do not use transcranial doppler monitoring to guide clinical management of an aneurysmal subarachnoid haemorrhage except in the context of clinical research.

Unexplained neurological deterioration

1.3.2 For people with unexplained neurological deterioration after a subarachnoid haemorrhage, offer a non-contrast CT head scan as the first diagnostic investigation to determine the cause.

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on monitoring and investigating for deterioration.

Full details of the evidence and the committee's discussion are in evidence review E: monitoring for raised intracranial pressure and vasospasm.

Hydrocephalus

1.3.3 Base a diagnosis of acute or chronic hydrocephalus on the person's symptoms and signs, and on a comparison of current and previous CT or other brain imaging.

Acute hydrocephalus

1.3.4 Consider drainage or diversion of cerebrospinal fluid for people with neurological deterioration caused by acute hydrocephalus.

Chronic hydrocephalus

1.3.5 For people with persistent or progressive symptoms and a clinical diagnosis of chronic hydrocephalus, consider drainage or permanent diversion of cerebrospinal fluid. If there is uncertainty about the likely benefit of permanent diversion, consider a trial of temporary drainage to assess the need for permanent diversion.

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on hydrocephalus.

Full details of the evidence and the committee's discussion are in evidence review G: detecting hydrocephalus and evidence review H: managing hydrocephalus.

Delayed cerebral ischaemia

1.3.6 Ensure euvolaemia (normal blood volume) in people with delayed cerebral ischaemia after an aneurysmal subarachnoid haemorrhage and consider treatment with a vasopressor if symptoms persist. Bear in mind that clinical improvement from vasopressor treatment may be temporary.

For a short explanation of why the committee made this recommendation and how it might affect practice, see the rationale and impact section on delayed cerebral ischaemia.

Full details of the evidence and the committee's discussion are in evidence review F: management of delayed cerebral ischaemia.

1.4 Follow-up care

Follow-up care plan

1.4.1 Agree and document a plan for follow-up care with the person after their aneurysmal subarachnoid haemorrhage. Give a paper copy of the plan to the person (and their family or carers if appropriate) and include details of who to contact at the specialist centre for ongoing advice and support.

1.4.2 Include the follow-up care plan in the person's medical record and discharge correspondence.

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on follow-up care plan.

Full details of the evidence and the committee's discussion are in evidence review S: patient information.

Rehabilitation

1.4.3 Offer rehabilitation after aneurysmal subarachnoid haemorrhage in line with the NICE guidelines on stroke rehabilitation in adults and rehabilitation after critical illness in adults.

Follow-up neuroimaging

1.4.4 Consider follow-up neuroimaging for people who have had an aneurysmal subarachnoid haemorrhage, taking into account the extent of their recovery and the suitability of further imaging. Base the choice of imaging modality, and the frequency and duration of imaging follow-up, on the:

- type and outcome of any neurointervention or neurosurgery on the initial aneurysm
- presence of any non-culprit aneurysms
- estimated risk of further bleeding
- risks of planned investigations and any subsequent interventions
- person's preference.

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on follow-up neuroimaging.

Full details of the evidence and the committee's discussion are in evidence review O: imaging strategies for follow-up.

Managing non-culprit (unruptured) aneurysms

1.4.5 A multidisciplinary team (MDT) that includes an interventional neuroradiologist and a neurosurgeon should evaluate the options for managing non-culprit (unruptured) aneurysms, including:

- endovascular coiling
- neurosurgical clipping
- conservative management and follow-up monitoring.

1.4.6 When evaluating the options for managing a non-culprit aneurysm, the MDT should take into account:

- the size and location of the aneurysm
- the estimated lifetime risk of the aneurysm rupturing
- the estimated risk of each treatment option
- any comorbidities
- the person's preferences.

1.4.7 Discuss the proposed management plan and any alternative options with the person (and their family or carers as appropriate). Base the discussion on the factors listed in recommendation 1.4.6. Agree and document a final management plan.

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on managing non-culprit (unruptured) aneurysms.

Full details of the evidence and the committee's discussion are in evidence review P: non-culprit aneurysms.

Other NICE guidance on endovascular procedures for non-culprit (unruptured) aneurysms

- NICE medical technologies guidance on Pipeline Flex embolisation device with Shield Technology for the treatment of complex intracranial aneurysms
- NICE interventional procedures guidance on endovascular insertion of an intrasaccular wire-mesh blood-flow disruption device for intracranial aneurysms

- NICE interventional procedures guidance on coil embolisation of unruptured intracranial aneurysms.

Managing other conditions after discharge from hospital

Hypertension

1.4.8 Manage blood pressure in people aged 18 and over who have had an aneurysmal subarachnoid haemorrhage in line with the NICE guideline on hypertension in adults.

Conditions treated with an antiplatelet or anticoagulant

1.4.9 Do not withhold treatment with antiplatelets or anticoagulants solely on the basis of an aneurysmal subarachnoid haemorrhage if the culprit aneurysm has been secured by coiling or clipping.

1.4.10 Balance the risks and benefits of treatment with an antiplatelet or anticoagulant, taking into account specialist assessment of the risk of a future subarachnoid haemorrhage.

Smoking

1.4.11 Encourage people who smoke to stop, and consider smoking cessation support as set out in the recommendations on stop-smoking interventions in the NICE guideline on tobacco.

Headaches

1.4.12 Assess, diagnose and manage headaches in people who have had an aneurysmal subarachnoid haemorrhage in line with the NICE guideline on headaches in over 12s.

1.4.13 Be aware that headaches in people with a history of aneurysmal subarachnoid

haemorrhage:

- are common and generally benign
- may be due to chronic hydrocephalus if the person has additional symptoms or signs such as gait disturbance, incontinence, incoordination or cognitive impairment.

Seizures

1.4.14 Manage seizures in people who have recovered from an aneurysmal subarachnoid haemorrhage in line with the NICE guideline on epilepsies in children, young people and adults.

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on managing other conditions after discharge from hospital.

Full details of the evidence and the committee's discussion are in evidence review Q: long-term medicines for reducing the risk of subsequent subarachnoid haemorrhage and evidence review R: long-term medication for managing the consequences of subarachnoid haemorrhage.

Investigations to detect aneurysms in relatives

1.4.15 Explain to people (and their families if appropriate) who have had an aneurysmal subarachnoid haemorrhage and are concerned about possible aneurysms in their relatives that:

- routine testing to check for aneurysms in relatives has not been shown to save lives or prevent aneurysmal subarachnoid haemorrhages
- testing for relatives is based on an assessment of the relative's own risk
- testing is usually limited to people with at least 2 first-degree relatives (father, mother, sister or brother) who have had an aneurysmal subarachnoid

haemorrhage.

Tell people where they can find more information about testing for relatives, such as the NHS webpage on diagnosis of brain aneurysm.

For a short explanation of why the committee made this recommendation and how it might affect practice, see the rationale and impact section on investigations to detect aneurysms in relatives.

Full details of the evidence and the committee's discussion are evidence review T: investigating relatives of people with aneurysmal subarachnoid haemorrhage.

1.5 Information and support

1.5.1 Follow the recommendations in the section on enabling patients to actively participate in their care in the NICE guideline on patient experience in adult NHS services, including:

- establishing the most effective way of communicating with the person and providing information in a format that is accessible to them
- avoiding jargon, using words the person will understand and explaining unfamiliar words.

1.5.2 When making decisions with people about their treatment and care, follow the NICE guideline on shared decision making.

1.5.3 When supporting people who may lack capacity to make decisions about their treatment and care, follow the NICE guideline on decision making and mental capacity.

1.5.4 Adapt written and verbal information about aneurysmal subarachnoid haemorrhage to the needs and preferences of the person (and their family or carers if appropriate).

At diagnosis

1.5.5 Explain to the person (and their family or carers if appropriate) what an aneurysmal subarachnoid haemorrhage is and what the treatment options are, including their benefits and risks.

During the hospital stay

1.5.6 Give the person (and their family or carers if appropriate) information about complications that can happen after an aneurysmal subarachnoid haemorrhage, such as:

- a build-up of fluid on the brain (hydrocephalus)
- a reduced supply of blood to the brain (delayed cerebral ischaemia)
- speech or communication difficulties
- physical disabilities
- seizures.

1.5.7 Tell the person (and their family or carers if appropriate) that common symptoms reported by people who have had a subarachnoid haemorrhage include:

- headaches, fatigue and sleep disturbances
- anxiety, low moods and increased irritability
- problems with memory and cognitive function
- changes to smell, taste, hearing or vision.

1.5.8 Give people who wish to receive it (and their family or carers if appropriate) information about their estimated future risk of another subarachnoid haemorrhage. Base the information on specialist assessment by the MDT of the person's medical circumstances, including:

- the effectiveness of the treatment of the ruptured aneurysm

- the presence and growth of additional aneurysms
- their smoking status.

1.5.9 Give the person advice on returning to their usual activities including work, exercise, driving and sexual activity.

At discharge

1.5.10 Check that the person has been given advice about wound care and medicines, a copy of their follow-up care plan and details of who to contact at their specialist centre if they have questions or concerns. Give them details of local and national support groups.

At follow-up

1.5.11 Discuss the person's return to their usual activities (see recommendation 1.5.9).

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on information and support.

Full details of the evidence and the committee's discussion are in evidence review S: patient information and evidence review N: risk of subsequent subarachnoid haemorrhage.

Terms used in this guideline

This section defines terms that have been used in a particular way for this guideline.

Senior clinical decision-maker

A clinician with the necessary training and experience to assess people with suspected subarachnoid haemorrhage, confirm subarachnoid haemorrhage symptoms and signs, and

refer people for further investigation. This may be a consultant, a staff-grade, associate-specialist or specialty doctor, or a doctor in a training grade who has been delegated to do this because they have the necessary competencies.

Recommendations for research

The guideline committee has made the following recommendations for research.

Key recommendations for research

1 Timing of CT head scans

What is the relative accuracy of CT head scans at different time intervals, for example 12 hours or 24 hours after symptom onset, to diagnose subarachnoid haemorrhage?

For a short explanation of why the committee made this recommendation for research, see the rationale section on diagnosing a subarachnoid haemorrhage.

Full details of the evidence and the committee's discussion are in evidence review B: diagnostic accuracy of investigations.

2 Predictors of death and disability

What variables predict death or disability for people with aneurysmal subarachnoid haemorrhage?

For a short explanation of why the committee made this recommendation for research, see the rationale section on diagnosing a subarachnoid haemorrhage.

Full details of the evidence and the committee's discussion are in evidence review C: severity scoring systems.

3 Nimodipine

What is the clinical and cost effectiveness of nimodipine in the management of aneurysmal subarachnoid haemorrhage?

For a short explanation of why the committee made this recommendation for research, see the rationale section on nimodipine.

Full details of the evidence and the committee's discussion are in evidence review D: medical management strategies.

4 Novel endovascular interventions

What is the clinical and cost effectiveness of novel endovascular techniques and devices such as coated coils, endoluminal flow diverters and intrasaccular devices to treat aneurysmal subarachnoid haemorrhage?

For a short explanation of why the committee made this recommendation for research, see the rationale section on managing the culprit aneurysm.

Full details of the evidence and the committee's discussion are in evidence review L: interventions to prevent re-bleeding.

5 Risk stratification tool to estimate risk of recurrence

What is the utility of a risk stratification tool to estimate the risk of subsequent aneurysmal subarachnoid haemorrhage?

For a short explanation of why the committee made this recommendation for research, see the rationale section on information and support.

Full details of the evidence and the committee's discussion are in evidence review N: risk of subsequent subarachnoid haemorrhage.

Other recommendations for research

6 Interventions for aneurysmal subarachnoid haemorrhage in

people with major neurological deficit

What is the outcome of intervention to prevent rebleeding in people who present with or rapidly develop severe neurological deficits as a consequence of acute aneurysmal subarachnoid haemorrhage?

For a short explanation of why the committee made this recommendation for research, see the rationale section on managing the culprit aneurysm.

Full details of the evidence and the committee's discussion are in evidence review L: interventions to prevent re-bleeding.

7 Managing acute hydrocephalus

What is the most clinically and cost-effective method of cerebrospinal fluid drainage or diversion (for example shunt surgery, external ventricular drain surgery or lumbar drain) for symptomatic acute hydrocephalus?

For a short explanation of why the committee made this recommendation for research, see the rationale section on hydrocephalus.

Full details of the evidence and the committee's discussion are in evidence review H: managing hydrocephalus.

8 Transcranial doppler monitoring

What is the clinical and cost effectiveness of routine transcranial doppler monitoring to guide clinical management of aneurysmal subarachnoid haemorrhage?

For a short explanation of why the committee made this recommendation for research, see the rationale section on monitoring and investigating for deterioration.

Full details of the evidence and the committee's discussion are in evidence review E: monitoring for raised intracranial pressure and vasospasm.

9 Intracranial hypertension

What is the impact of routine monitoring of intracranial hypertension on subsequent management and outcome in people with aneurysmal subarachnoid haemorrhage who are unconscious or ventilated on an intensive care unit?

For a short explanation of why the committee made this recommendation for research, see the rationale section on intracranial hypertension.

Full details of the evidence and the committee's discussion are in evidence review I: detecting intracranial hypertension and evidence review J: managing intracranial hypertension.

10 Intra-arterial therapies to manage delayed cerebral ischaemia

What is the impact of intra-arterial therapies to manage delayed cerebral ischaemia on outcome in people with aneurysmal subarachnoid haemorrhage?

For a short explanation of why the committee made this recommendation for research, see the rationale section on delayed cerebral ischaemia.

Full details of the evidence and the committee's discussion are in evidence review F: management of delayed cerebral ischaemia.

11 Vasopressors to manage delayed cerebral ischaemia

What is the clinical and cost effectiveness of vasopressors to manage delayed cerebral ischaemia in people with aneurysmal subarachnoid haemorrhage?

For a short explanation of why the committee made this recommendation for research, see the rationale section on delayed cerebral ischaemia.

Full details of the evidence and the committee's discussion are in evidence review F: management of delayed cerebral ischaemia.

12 Blood pressure targets

What is the clinical and cost effectiveness of a lower blood pressure treatment target relative to the standard blood pressure treatment target for people with aneurysmal subarachnoid haemorrhage?

For a short explanation of why the committee made this recommendation for research, see the rationale section on managing other conditions after discharge from hospital.

Full details of the evidence and the committee's discussion are in evidence review Q: long-term medicines for reducing the risk of subsequent subarachnoid haemorrhage.

13 Investigations for relatives

What is the clinical and cost effectiveness of investigations to detect intracranial arterial aneurysms in first-degree relatives of people who have had an aneurysmal subarachnoid haemorrhage?

For a short explanation of why the committee made this recommendation for research, see the rationale section on investigations to detect aneurysms in relatives.

Full details of the evidence and the committee's discussion are in evidence review T: investigating relatives of people with aneurysmal subarachnoid haemorrhage.

Rationale and impact

These sections briefly explain why the committee made the recommendations and how they might affect practice.

Assessment and referral for diagnostic investigation

Recommendations 1.1.1 to 1.1.7

Why the committee made the recommendations

People with a suspected subarachnoid haemorrhage can present with a wide range of symptoms and signs. There was little evidence to indicate which symptoms or signs specifically point to a diagnosis of subarachnoid haemorrhage. The committee agreed that the consequences of a missed diagnosis may be severe and include disability and death. Urgent investigation is required to confirm a diagnosis of subarachnoid haemorrhage and facilitate early treatment to prevent rebleeding from the ruptured aneurysm. Clinicians should therefore be alert to the possibility of subarachnoid haemorrhage in people presenting with unexplained acute severe headache, reduced consciousness, seizure, focal neurological deficit or other suggestive symptoms. Some people present with non-specific symptoms, such as nausea and vomiting, photophobia, or neck pain or stiffness. In these cases, a diagnosis of subarachnoid haemorrhage is more likely to be missed.

The committee's experience indicated that a 'thunderclap' headache is a presenting symptom in most people with a subarachnoid haemorrhage. However, they noted that this type of headache is a common presentation in emergency departments and around 10% of people who present with this symptom have a diagnosis of subarachnoid haemorrhage confirmed; the majority are diagnosed with other conditions, for example, migraine. The committee agreed that other symptoms and signs are also commonly seen in people with a subarachnoid haemorrhage. These can be used, together with clinical judgement, to support clinical assessment and guide decisions on further diagnostic investigations. The committee noted that these symptoms and signs of subarachnoid haemorrhage can also be caused by a number of other conditions. Therefore, a senior clinician should confirm the assessment of subarachnoid haemorrhage and arrange immediate referral for further

investigation.

There is good evidence showing that non-contrast CT head scans carried out within 6 hours of symptom onset are highly accurate and can be used to rule out a diagnosis of subarachnoid haemorrhage, therefore avoiding the need for further investigation with a lumbar puncture. CT head scans done more than 6 hours after symptom onset are less accurate (see the section on diagnosing a subarachnoid haemorrhage for more information).

Evidence on decision tools, including the Ottawa Subarachnoid Haemorrhage Rule for Headache Evaluation, showed that these tools have a high level of accuracy in ruling out subarachnoid haemorrhage, but are less accurate at ruling it in, with a large number of false-positive identifications. Although these tools are beneficial in ensuring that no cases are missed, over-reliance on them risks harm from unnecessary imaging and invasive investigations. The committee noted that the tools use a broad range of symptoms and signs that are not specific to subarachnoid haemorrhage.

How the recommendations might affect practice

The recommendations may be useful for non-specialist clinicians, but are not expected to lead to significant changes in practice. Non-contrast CT head scans are the usual first-line investigation for suspected subarachnoid haemorrhage, and this is not expected to change.

Return to recommendations

Pain relief and neurological assessment

Recommendations 1.1.8 and 1.1.9

Why the committee made the recommendations

Although there was limited evidence on the use of specific analgesia or sedation, the committee agreed that pain in adults with aneurysmal subarachnoid haemorrhage should be managed with analgesics in line with standard clinical practice. Headache is usually treated with simple analgesics such as paracetamol, escalating to opioids as needed. The committee agreed that the sedative and pupillary effect of opioid analgesics should be

taken into account when doing a neurological assessment, but should not preclude their use.

How the recommendations might affect practice

The recommendations generally reflect current practice and are not likely to result in changes.

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Diagnosing a subarachnoid haemorrhage

Recommendations 1.1.10 to 1.1.17

Why the committee made the recommendations

The committee looked at evidence on non-contrast CT head scans, lumbar puncture and MRI. In the studies, the CT scans were reviewed by either a general radiologist or a neuroradiologist. There was good evidence showing that CT head scans done within 6 hours of symptom onset have a high diagnostic accuracy. Taking into account the invasive risks of lumbar puncture, the difficulty of monitoring patients during MRI and the costs of both procedures, the committee concluded that these procedures should not be routinely offered if a CT head scan, done within 6 hours of symptom onset and reported and documented by an appropriately experienced radiologist, shows no evidence of a subarachnoid haemorrhage. In these circumstances alternative diagnoses should be considered and advice sought from a specialist, for example in neurosurgery, neuroradiology, neurology or stroke medicine.

If the CT head scan is done more than 6 hours after symptom onset, the evidence showed that diagnostic accuracy is reduced and false-negative results are more likely. The committee therefore agreed that further investigation with a lumbar puncture should be considered if a CT head scan done more than 6 hours after ictus does not confirm the diagnosis of subarachnoid haemorrhage.

When a lumbar puncture is indicated, the committee agreed that it should be done at least 12 hours after symptom onset, when bilirubin formation is sufficient to be detected reliably. The committee considered that the diagnostic accuracy of earlier lumbar puncture

(to detect blood in the cerebrospinal fluid) is likely to be low because it can take several hours for blood to appear in the lumbar subarachnoid sac.

There was limited evidence on the relative accuracy of non-contrast CT head scanning at various time intervals greater than 6 hours after symptom onset, so the committee made a recommendation for research on timing of CT head scans.

Referral and transfer to a specialist neurosurgical centre

If subarachnoid haemorrhage is diagnosed, the committee noted that an urgent decision is needed on whether to transfer the person to specialist care. The committee decided to make a consensus recommendation to stress the importance of an urgent discussion with a specialist neurosurgical centre.

Although evidence on a number of severity scores showed an association with morbidity and mortality, there was inconsistency across the scores and the evidence was not sufficient to recommend the use of any score on its own. The committee agreed that, although severity scoring can be a useful clinical descriptor, decisions on transfer should be based on a holistic patient assessment rather than a severity score on its own, to avoid inappropriate withholding of specialist neurosurgical care from people whose score indicates a poor clinical condition.

The committee noted that evidence to support the prognostic accuracy of the severity scores was weak and made a recommendation for research on predictors of death and disability.

How the recommendations might affect practice

Centres that routinely perform lumbar puncture after a negative CT head scan may see a reduction in the use of lumbar puncture in people with an early negative CT head scan. Reliance on severity scoring to determine transfer to specialist centres may reduce, leading to more people appropriately being transferred for treatment.

Return to recommendations

Detecting an aneurysm

Recommendations 1.1.18 to 1.1.23

Why the committee made the recommendations

Evidence showed that CT angiography has a high level of accuracy in identifying aneurysms causing subarachnoid haemorrhage but evidence for the diagnostic accuracy of magnetic resonance angiography (MRA) was less compelling. CT angiography is the quickest to perform, is non-invasive, does not usually necessitate sedation or general anaesthesia and is available in most centres. MRA and DSA are more complex and time-consuming procedures that need specialist input and have a higher risk of complications. DSA is regarded as the 'gold standard' investigation and is currently commonly carried out when CT angiography is negative but there is a high suspicion of aneurysmal subarachnoid haemorrhage, whereas the complexities involved in obtaining high-quality MRA images make this less beneficial. The committee agreed that DSA should be reserved for instances when CT angiography has not detected a suspected aneurysm.

How the recommendations might affect practice

The recommendations largely reflect current practice and are not expected to lead to changes.

Return to recommendations

Medical management

Recommendations 1.2.1 to 1.2.3

Why the committee made the recommendations

Nimodipine

Although limited evidence showed some reductions in mortality, rebleeding, disability and delayed cerebral ischaemia with nimodipine, most of the evidence available was graded as low or very low quality, predominately due to imprecision of outcome data, and risk of bias. There was a high risk of uncertainty around a number of outcomes due to significant statistical imprecision around the summary effect estimates, with wide confidence intervals crossing the thresholds for clinical significance.

The committee noted that the studies in the evidence review were conducted in the

1980s, with a lack of more recent evidence. In most of the studies, nimodipine was commenced up to 96 hours after ictus and continued for up to 3 weeks before neurosurgical management. Therefore, the committee had reservations about the applicability of this evidence to current practice, in which people with aneurysmal subarachnoid haemorrhage are frequently treated by endovascular coiling within 48 hours of ictus. The committee could not be sure that the benefits from nimodipine are maintained with current treatments to secure the ruptured aneurysm, but they agreed that, without evidence of significant harms, a recommendation to consider nimodipine was appropriate in the acute management of aneurysmal subarachnoid haemorrhage.

The committee noted that the use of nimodipine is entrenched in clinical practice and was surprised at the lack of more compelling contemporary evidence for the use of enteral nimodipine in the management of aneurysmal subarachnoid haemorrhage. The lack of recent evidence influenced their decision to make a weak recommendation for the use of nimodipine. The committee also made a recommendation for research on nimodipine to determine its place in current practice.

Most of the evidence related to the use of oral nimodipine but some was drawn from studies that included intravenous nimodipine. The committee were aware that intravenous nimodipine has a high cost and were uncertain whether it is likely to be cost effective in patients who are unconscious or ventilated, or unable to swallow. The committee were also aware that some clinicians recommend administration of crushed nimodipine tablets to these patients via a nasogastric tube to avoid the need to use intravenous nimodipine. The committee noted that intravenous nimodipine may be useful for patients in whom poor absorption of the drug is suspected. Based on these observations and their experience, the committee agreed that intravenous nimodipine should be reserved for patients in whom enteral administration is not suitable.

Reducing the risk of venous thromboembolism

The committee noted that NICE's guideline on reducing the risk of hospital-acquired venous thromboembolism (VTE) includes assessment of bleeding risk and alternatives to pharmacological VTE prophylaxis, and is therefore suitable for people admitted to hospital with a subarachnoid haemorrhage before their aneurysm is secured and after it is secured.

Short-course tranexamic acid

Evidence on tranexamic acid in the management of aneurysmal subarachnoid

haemorrhage was mixed, and most was from small studies from the 1970s and 1980s. Some of the evidence suggested that short courses of intravenous tranexamic acid started immediately after diagnosis and before a planned intervention (endovascular coiling or neurosurgical clipping) reduce the risks of rebleeding. However, there was no evidence showing that they reduce death or disability.

The committee were aware that short-course tranexamic acid is occasionally used in current practice if interventional treatment to secure the aneurysm is suitable but not available within a short time frame. However, the committee agreed that the administration of tranexamic acid should not delay interventional treatment to secure the aneurysm.

How the recommendations might affect practice

Nimodipine

The recommendation is not expected to substantially change the current practice of giving nimodipine after an aneurysmal subarachnoid haemorrhage.

Reducing the risk of venous thromboembolism

The recommendation is not expected to change current practice.

Return to recommendations

Managing the culprit aneurysm

Recommendations 1.2.4 to 1.2.8

Why the committee made the recommendations

The committee noted that around half of people who survive an aneurysmal subarachnoid haemorrhage will have a second bleed from the culprit aneurysm within weeks, and the mortality from a second bleed can exceed 50%. Interventional treatment with endovascular coiling or neurosurgical clipping, if suitable, can secure the aneurysm and prevent rebleeding.

The committee acknowledged that interventional treatment is not suitable for some people

who have a major neurological deficit after an aneurysmal subarachnoid haemorrhage, and that the costs of long-term nursing care or rehabilitation can be considerable. Very little evidence was found for this group, so the committee made a recommendation for research on interventions for aneurysmal subarachnoid haemorrhage in people with major neurological deficit.

Severity scoring systems might help clinicians identify people for whom intervention is likely to be justified, but none of the severity scoring systems currently in use reliably predicts morbidity and mortality in people with aneurysmal subarachnoid haemorrhage. In addition, the committee agreed that clinical state and severity score can vary over time, especially soon after symptom onset. Decisions on clinical management should therefore be based on a holistic patient assessment rather than solely on a severity score. Factors that should be considered by clinicians and discussed with the patient include: neurological status, performance status and comorbidities.

The evidence was not sufficient to determine the clinical effectiveness of endovascular coiling compared with neurosurgical clipping, although a small amount of evidence suggested that endovascular coiling might be more beneficial. Endovascular coiling is less invasive and potentially safer, so the committee agreed that it should be offered as the first option, taking factors such as aneurysm characteristics and the amount and location of subarachnoid blood into account. The committee agreed that neurosurgical clipping should be considered if endovascular coiling is not a suitable treatment option. They stressed that any procedure to secure the aneurysm should be performed without delay to minimise the risk of rebleeding.

Newer, more expensive interventional technologies are being used but there is little evidence on their effectiveness, so the committee made a recommendation for research on novel endovascular interventions.

How the recommendations might affect practice

Endovascular coiling accounts for around 75% of interventions done in current practice and the recommendation is not expected to change this. Most interventions are carried out within 48 hours of admission. However, this may vary according to the availability of interventional neuroradiologists and vascular neurosurgeons, and the capacity of neurosurgical centres. For people admitted during weekends, endovascular coiling should be available from the same interventional neuroradiology teams who will provide thrombectomy for stroke, in line with the recommendations on thrombectomy in the NICE

guideline on stroke and transient ischaemic attack in over 16s. However, provision of neurosurgical clipping during weekends may necessitate changes to services such as the setting up of appropriate networks.

Return to recommendations

Monitoring and investigating for deterioration

Recommendations 1.3.1 and 1.3.2

Why the committee made the recommendations

There was no evidence on the routine use of direct intracranial pressure monitoring for raised intracranial pressure. Very limited evidence from 1 study on transcranial doppler monitoring for vasospasm suggested an increase in mortality, morbidity and length of hospital stay compared with no transcranial doppler monitoring. The committee agreed that these outcomes were unlikely to be directly caused by the transcranial doppler monitoring. However, they were concerned that such monitoring might influence subsequent decisions, for example about investigations or interventions, and so indirectly affect outcomes. They therefore agreed that transcranial doppler monitoring should only be used in the context of clinical research. The committee noted that there is increasing enthusiasm for the use of this modality and made a recommendation for research on transcranial doppler monitoring.

There was no evidence on the investigation of unexplained neurological deterioration in people with aneurysmal subarachnoid haemorrhage. The committee agreed that in current practice unexplained neurological deterioration is initially investigated with a non-contrast CT scan, which can indicate the cause of deterioration including ventricular enlargement suggestive of hydrocephalus, cerebral ischaemia, intracranial haematoma or evidence of rebleeding.

How the recommendations might affect practice

In current practice the use of transcranial doppler monitoring varies widely. The recommendation is likely to stop this type of monitoring in centres that use it in routine practice. CT head scans are used to investigate unexplained neurological deterioration in current practice and the recommendation will not affect this.

Return to recommendations

Hydrocephalus

Recommendations 1.3.3 to 1.3.5

Why the committee made the recommendations

Acute hydrocephalus

There was no evidence on diagnosing acute hydrocephalus. Based on their experience, the committee agreed that hydrocephalus is suspected on the basis of symptoms and signs of raised intracranial pressure such as an altered level of consciousness or neurological deterioration, and that the diagnosis should be confirmed by comparing a CT head scan with previous CT or other head scans to show an increase in the size of the ventricular system. The committee agreed that MRI offers no advantage over CT for diagnosing hydrocephalus in people with aneurysmal subarachnoid haemorrhage, is more expensive and is a difficult procedure for people who are unwell.

The committee noted that acute hydrocephalus can lead to severe disability or death if not treated promptly by drainage or diversion of cerebrospinal fluid. There was no evidence on the effectiveness of different techniques for drainage or diversion in acute hydrocephalus. The committee agreed that either drainage or diversion could be considered. They also made a recommendation for research on managing acute hydrocephalus.

Chronic hydrocephalus

There was little evidence to inform recommendations on diagnosing and managing chronic hydrocephalus. Based on their experience, the committee agreed that chronic hydrocephalus is uncommon and typically presents several weeks or months after an aneurysmal subarachnoid haemorrhage, with reduced consciousness, gait disturbance or other neurological symptoms. As with acute hydrocephalus, the committee agreed that chronic hydrocephalus is suspected based on symptoms and signs and a diagnosis should be confirmed based on a comparison of current CT head scans with previous CT or other head scans.

In current clinical practice most people with persisting or progressive symptoms and

radiological evidence of ventricular dilatation are offered drainage of cerebrospinal fluid, which improves symptoms in the majority. If the likelihood of symptom improvement is uncertain, some clinicians advocate a trial of temporary drainage, for example, serial lumbar punctures, before considering permanent diversion of cerebrospinal fluid. The committee agreed with this approach.

The committee discussed making a recommendation for research on chronic hydrocephalus but concluded that research in this area might not be feasible within a reasonable time frame and have little impact on clinical practice.

How the recommendations might affect practice

The recommendations reflect current practice.

Return to recommendations

Intracranial hypertension

Recommendation for research

Why the committee did not make a recommendation

There was little evidence on diagnosing and treating intracranial hypertension. The committee agreed that the diagnostic accuracies of transcranial doppler and ultrasound measurement of optic nerve sheath diameter are too low for reliable detection of intracranial hypertension when compared with direct intracranial pressure measurement. The committee also acknowledged that there is no evidence that interventions to lower intracranial pressure improve clinical outcome.

The committee agreed that raised intracranial pressure is common in people with aneurysmal subarachnoid haemorrhage, but intracranial hypertension that impedes blood flow to the brain and contributes to brain injury is generally only seen in the most severely ill. These people are usually unconscious or need ventilation in an intensive care unit. They are a heterogeneous population and management varies widely, with some clinicians advocating routine monitoring of intracranial pressure to guide intervention (such as drainage of cerebrospinal fluid, hypertonic saline or vasopressor therapy) to lower intracranial pressure and maintain cerebral perfusion. Other clinicians favour management

without intracranial pressure monitoring.

Intracranial pressure can be monitored by inserting an intracranial pressure bolt or using an external ventricular drain inserted to manage acute hydrocephalus. The committee acknowledged that insertion of a pressure bolt is associated with risk, and monitoring of intracranial pressure will only improve outcome if it leads to effective intervention.

The committee debated the variation in current practice and were not able to reach a consensus on the role of interventions to diagnose and treat intracranial hypertension, and so they made a recommendation for research.

Return to recommendation for research

Delayed cerebral ischaemia

Recommendation 1.3.6

Why the committee made the recommendation

There was very little evidence on delayed cerebral ischaemia so the committee based the recommendation on their clinical experience. They noted that current practice for managing delayed cerebral ischaemia is to maintain cerebral blood flow to prevent or limit cerebral infarction. Intravenous fluid is usually given to ensure euvolemia and if symptoms persist a vasopressor is administered to raise systemic blood pressure. The committee agreed with this approach, but added that the improvements seen after these measures may be temporary, and there was no evidence of impact on longer-term outcomes. Treatment for people whose condition is not improved by vasopressor therapy varies widely. Some clinicians recommend cerebral angiography and intra-arterial therapies, including intra-arterial vasodilators and angioplasty. However, the committee were unable to reach a consensus on the use of intra-arterial therapies. They made recommendations for research on intra-arterial therapies to manage delayed cerebral ischaemia and vasopressors to manage delayed cerebral ischaemia.

How the recommendation might affect practice

The recommendation reflects current practice.

Return to recommendation

Follow-up care plan

Recommendations 1.4.1 and 1.4.2

Why the committee made the recommendations

Evidence from surveys and interviews with people who had an aneurysmal subarachnoid haemorrhage showed that those who did not receive clear information about their medical care after discharge felt anxious and 'abandoned'. Those who were given this information, together with details of who to contact for ongoing advice, said they felt more supported. The committee agreed that the follow-up care plan should be included in the person's medical record and discharge correspondence.

How the recommendations might affect practice

The amount and quality of information given to people about follow-up care after an aneurysmal subarachnoid haemorrhage varies. This recommendation can be expected to improve the provision of this information.

Return to recommendations

Follow-up neuroimaging

Recommendation 1.4.4

Why the committee made the recommendation

No clinical evidence was found on follow-up neuroimaging. Based on their knowledge and experience, the committee agreed that there is a risk of aneurysm recurrence, progression of non-culprit aneurysms and formation of new aneurysms. They agreed that follow-up imaging should be considered, based on the person's clinical situation and risk factors.

How the recommendation might affect practice

The recommendation reflects current practice.

Return to recommendation

Managing non-culprit (unruptured) aneurysms

Recommendations 1.4.5 to 1.4.7

Why the committee made the recommendations

There was not enough good evidence to enable the committee to recommend a preferred management option for non-culprit aneurysms, although they agreed that the risk of a non-culprit aneurysm rupturing is higher in people who have had an aneurysmal subarachnoid haemorrhage than those who have not. Based on their experience, the committee agreed that the overall probability of a non-culprit aneurysm rupturing is low, so interventional treatment of all non-culprit aneurysms is unlikely to be a cost-effective strategy. They agreed that conservative management usually includes monitoring of the aneurysm with MRA to detect changes in the aneurysm's size or shape. The committee were in agreement that the frequency of monitoring should be based on a balance between the risks of aneurysm rupture and the risks of interventional treatment, and take into account multidisciplinary team, neuroradiological and neurosurgical opinion, and the person's preferences.

The committee's experience was that people with unruptured aneurysms who are offered conservative management are often anxious about the possibility of a future rupture. They therefore recommended that all treatment options be discussed with the person.

How the recommendations might affect practice

Current management of unruptured aneurysms varies. The recommendations are not expected to lead to substantial changes in practice.

Return to recommendations

Managing other conditions after discharge from hospital

Recommendations 1.4.8 to 1.4.14

Why the committee made the recommendations

Hypertension

Uncontrolled hypertension is recognised to be a risk factor for aneurysmal subarachnoid haemorrhage and may pose a greater risk to people with a history of this type of stroke. The committee agreed that blood pressure should be controlled in line with the NICE guideline on hypertension in adults.

There was no evidence on long-term blood pressure control specifically for people with a history of aneurysmal subarachnoid haemorrhage, so the committee made a recommendation for research on blood pressure targets.

Conditions treated with an antiplatelet or anticoagulant

There was little evidence about the effect of an antiplatelet or anticoagulant on the risk of recurrent intracranial bleeding. The committee agreed that, in their experience, these medicines are safe for people with a secured aneurysm following an aneurysmal subarachnoid haemorrhage. For people with a higher risk of recurrence, specialist advice should be sought to judge the balance between the risk of recurrent or new intracranial bleeding and the risk of athero-embolic events.

Smoking

The committee noted that smoking can be a risk factor for an initial subarachnoid haemorrhage. They agreed that smoking cessation interventions, in addition to benefiting general health, may also reduce the risk of recurrent subarachnoid haemorrhage.

Headaches

The committee agreed, based on their experience, that people who develop headaches after recovering from an aneurysmal subarachnoid haemorrhage can become anxious and worry that their headache indicates new aneurysmal bleeding or a complication of the treatment they had for their aneurysm. This can lead to morbidity, multiple presentations to healthcare professionals and unnecessary investigations. There was no evidence on specific long-term medicines to relieve headaches as a consequence of subarachnoid haemorrhage. The committee agreed that headache should be assessed, diagnosed and managed in line with NICE's guideline on headaches in over 12s.

The committee agreed, based on their experience, that headaches are common and generally benign in people who have had a subarachnoid haemorrhage, but in some people may indicate chronic hydrocephalus.

Seizures

The committee agreed that people who have had an aneurysmal subarachnoid haemorrhage have an increased risk of seizures and epilepsy. There was no evidence on the use of long-term antiseizure medicines to prevent or relieve seizures in this population. They agreed that seizures after an aneurysmal subarachnoid haemorrhage should be treated in line with NICE's guidance on diagnosing and managing epilepsies.

How the recommendations might affect practice

The recommendations on hypertension, smoking, headaches and seizures are not expected to change practice. The recommendations on managing conditions treated with antiplatelets or anticoagulants may reduce delays in prescribing these medicines for people who have had a successfully treated aneurysmal subarachnoid haemorrhage. Although specialist input may be needed, this is not expected to have a large impact on services.

Return to recommendations

Investigations to detect aneurysms in relatives

Recommendation 1.4.15

Why the committee made the recommendation

No evidence was found on investigating relatives for intracranial aneurysms. The committee recognised that first-degree relatives of people who have had an aneurysmal subarachnoid haemorrhage are at higher risk of intracranial arterial aneurysm than the general population. The committee agreed that investigating for aneurysms in first-degree relatives may produce health benefits but could also lead to harm, including unnecessary anxiety and a consequent increase in visits to GPs and emergency departments. Moreover, the optimal timing and frequency of investigations to detect and monitor intracranial aneurysms in first-degree relatives is unknown.

The committee were aware that the NHS does not currently support routine screening for intracranial arterial aneurysms in relatives and any change in NHS policy could have a significant resource impact.

The committee acknowledged that in current practice investigation is typically only recommended for people thought to have a significant risk of having a brain aneurysm that could rupture at some point in the future, and this would usually only apply to people with 2 or more first-degree relatives who have had an aneurysmal subarachnoid haemorrhage. This reflects the advice given on the NHS website on screening for brain aneurysms.

The committee agreed that the lack of evidence for routine testing of relatives and current practice on testing should be explained to people who have had a subarachnoid haemorrhage, and their families as appropriate. Given the importance of this issue and the lack of evidence, the committee made a recommendation for research on investigations for relatives.

How the recommendation might affect practice

The recommendation is not expected to lead to a change in practice.

Return to recommendation

Information and support

Recommendations 1.5.1 to 1.5.11

Why the committee made the recommendations

Evidence from studies using surveys and interviews with people who have had an aneurysmal subarachnoid haemorrhage showed that they value information that is clear, concise and tailored to their own needs. Participants in the studies highlighted how difficult it was to remember information given to them verbally at the time of hospital admission and the need to have this information in a written form that they can take home at discharge. They also stressed the importance of information about their medical care and what to expect after discharge, including common symptoms, possible complications and where they can get advice and support.

The committee used their experience to agree topics that should be included, as a minimum, in the information given. They highlighted the importance of ease of access to information for people throughout their care pathway.

In the committee's experience, some people want information about the risk of recurrence of subarachnoid haemorrhage and some do not. They agreed that discussions should include the effect of individual variables on the person's risk of recurrence. The committee discussed the lack of a validated risk tool to inform estimates of individual risk and made a recommendation for research on a risk stratification tool to estimate risk of recurrence.

How the recommendations might affect practice

The content, delivery and quality of information given to people with aneurysmal subarachnoid haemorrhage varies widely. The recommendations are expected to encourage discussion that is tailored to the person's preferences.

Return to recommendations

Context

Subarachnoid haemorrhage is a bleed into the fluid-filled subarachnoid space around the brain and spinal cord. Spontaneous subarachnoid haemorrhage accounts for 5% of all strokes and is estimated to occur in 2 to 20 people per 100,000 per year. In around 80% of people, the bleed arises from rupture of an intracranial arterial aneurysm. Aneurysmal subarachnoid haemorrhage is slightly more common in women than men, and can occur across a wide range of ages with a median age at presentation between 50 and 60.

The main symptom of subarachnoid haemorrhage is a sudden and severe 'thunderclap' headache but there may also be neck stiffness, altered consciousness or seizures. The condition is more easily diagnosed in people presenting with severe symptoms, unconsciousness or sudden onset acute headache but some people with subarachnoid haemorrhage present with less severe or non-specific symptoms and signs. A high index of suspicion and holistic clinical assessment are therefore required to avoid missed diagnoses.

Urgent investigation to confirm a diagnosis of subarachnoid haemorrhage facilitates treatment to prevent rebleeding from the ruptured aneurysm and reduces disability and death. Although outcomes for people with subarachnoid haemorrhage have slowly improved, the risk of death remains high and those who survive are often severely disabled. This guideline aims to improve the speed and accuracy of diagnosis and the effectiveness of treatment. It provides recommendations based on current evidence covering initial assessment, diagnostic investigations, treatment options, management of complications and follow-up care. It also identifies areas where evidence is lacking and recommends research to help inform future guidance.

Finding more information and committee details

To find NICE guidance on related topics, including guidance in development, see the NICE topic page on cranial aneurysms.

For full details of the evidence and the guideline committee's discussions, see the evidence reviews. You can also find information about how the guideline was developed, including details of the committee.

NICE has produced tools and resources to help you put this guideline into practice. For general help and advice on putting our guidelines into practice, see resources to help you put NICE guidance into practice.

Update information

Minor changes since publication

September 2023: We amended recommendation 1.1.11 to add that any alternative diagnoses should be discussed with a senior clinical decision-maker.

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