NICE National Institute for Health and Care Excellence

Guidance assessment consultation for HTG10869 Middle meningeal artery embolisation for non-acute subdural haematomas

7 July 2026

Summary of the procedure

The brain is surrounded by a membrane called the dura. A subdural haematoma is a collection of blood in the space between the dura and the brain, usually caused by a head injury. This puts pressure on the brain and affects how it works. When the blood has been present for some time, often weeks or months, and there have been some changes in normal biological processes, it is called a non-acute subdural hematoma.

The aim of the procedure is to stop the bleeding and reduce pressure on the brain. Parts of the artery that supplies the dura with blood (the middle meningeal artery) are blocked (embolisation) under general or local anaesthesia. To reach the brain, a small tube (catheter) is inserted into an artery, usually in the thigh or forearm. A second, smaller catheter is then put through it to reach the middle meningeal artery. A blocking agent is then injected to block the artery.

NICE interventional procedures guidance applies to the NHS in England, Wales and Northern Ireland.

Guidance development process

NICE interventional procedures guidance evaluates procedures used for treatment or diagnosis. It provides evidence-based recommendations on the safety and efficacy of these procedures. The guidance supports healthcare professionals and commissioners to ensure that patients get the best possible care. By reviewing clinical evidence and considering patient outcomes, NICE aims to improve patient safety and treatment choices in the NHS.

Find out more on the NICE webpage on interventional procedures guidance.

NICE is producing this guidance on middle meningeal artery embolisation in the NHS. The interventional procedures advisory committee has considered the evidence and the views of clinical and patient experts.

This document has been prepared for consultation with the stakeholders. It summarises the evidence and views that have been considered, and sets out the recommendations made by the committee. NICE invites comments from the stakeholders for this evaluation and the public. This document should be read along with the evidence.

The committee is interested in receiving comments on the following:

- Has all of the relevant evidence been taken into account?
- Are the summaries of safety and efficacy reasonable interpretations of the evidence?
- Are the recommendations sound and a suitable basis for guidance to the NHS?
- Are there any aspects of the recommendations that need particular consideration to ensure we avoid unlawful discrimination against any group of people on the grounds of age, disability, gender reassignment, pregnancy and maternity, race, religion or belief, sex or sexual orientation?

After consultation:

- Based on the consultation comments received, the committee may meet again.
- If committee meets again it will consider the evidence, this evaluation consultation document and comments from stakeholders.
- The committee will then prepare the final draft guidance, which will go through a resolution process before the final guidance is agreed.

Note that this document is not NICE's final guidance on middle meningeal artery embolisation. The recommendations in section 1 may change after consultation.

More details are available in NICE's interventional procedures programme manual and NICE's HealthTech programme manual.

Key dates:

Closing date for comments: 27 July 2026

Second committee meeting: 10 September 2026

1 Recommendations

Middle meningeal artery embolisation with surgery, or alone when surgery is not suitable or not clinically indicated

1.1 Middle meningeal artery embolisation (MMAE) can be used in the NHS during the evidence generation period as an option to treat non-acute subdural haematomas:

- with surgery to remove the haematoma
- alone when surgery is not suitable or not clinically indicated.

There must be enhanced informed consent and auditing of outcomes.

MMAE alone when surgery is suitable but not chosen

1.2 More research is needed on MMAE alone when surgery to remove the haematoma is suitable but not chosen to treat non-acute subdural haematomas before it can be used in the NHS.

1.3 This procedure should only be done as part of formal research and a research ethics committee needs to have approved its use.

What this means in practice

MMAE with surgery, or alone when surgery is not suitable or not clinically indicated

There are uncertainties around the safety and efficacy of this procedure when used with surgery to remove the haematoma, or alone when surgery is not suitable or not clinically indicated. It can be used if needed while more evidence is generated. After this, NICE will review this guidance and the recommendations may change.

Healthcare professionals do not have to offer this procedure and should always discuss the available options with the person with a non-acute subdural haematoma before a joint decision is made.

Hospital trusts will have their own policies on funding procedures and monitoring results. NHS England may also have policies on funding of procedures.

Enhanced informed consent

Because there are uncertainties about the procedure's safety and efficacy, there must be an emphasis on informed consent. Healthcare professionals must make sure that people (and their families and carers as appropriate) understand the uncertainty and lack of evidence around a procedure's safety and efficacy using NICE's advice on shared decision making and NICE's information for the public. Healthcare professionals must also inform the clinical governance leads in their organisation if they want to do the procedure.

Auditing of outcomes

Healthcare professionals doing this procedure should collect data on the safety and outcomes of the procedure. Details about everyone having this procedure should be entered into an appropriate registry. If there is no data collection method already available, use NICE's interventional procedure outcomes audit tool. Healthcare professionals should regularly review the data on outcomes and safety.

Who should be involved with the procedure

Patient selection should take a multidisciplinary approach. Relevant disciplines include interventional neuroradiology, neurosurgery, geriatrics and trauma care. MMAE should only be done by an interventional neuroradiologist with specific training in this procedure.

MMAE alone when surgery is suitable but not chosen

There is not enough evidence to know whether this procedure is safe and efficacious. MMAE alone when surgery to remove the haematoma is suitable should only be done as part of formal research.

Auditing of outcomes

Healthcare professionals doing this procedure should collect data on the safety and outcomes of the procedure. Details about everyone having this procedure should be entered into an appropriate registry. If there is no data collection method already available, use NICE's interventional procedure outcomes audit tool. Healthcare professionals should regularly review the data on outcomes and safety.

Who should be involved with the procedure

Patient selection should take a multidisciplinary approach. Relevant disciplines include interventional neuroradiology, neurosurgery, geriatrics and trauma care. MMAE should only be done by an interventional neuroradiologist with specific training in this procedure.

What evidence generation is needed

Healthcare professionals must collect data specifically around the safety and efficacy of MMAE with surgery to remove the haematoma, or alone when surgery is not suitable or not clinically indicated, especially in the form of registry data relevant to the NHS. The data should be compared with data

from people who did not have the procedure. This can include historical controls with statistical matching.

For people having MMAE with surgery, data includes:

- longer-term efficacy outcomes including:
  - functional outcomes such as cognitive function
  - change in neurological symptoms such as headaches
  - quality of life
- patient selection, including:
  - symptom severity
  - whether the procedure is done for a new or recurrent haematoma.

For people having MMAE alone when surgery to remove the haematoma is not suitable or not clinically indicated, data includes:

- intermediate and longer-term efficacy outcomes including:
  - symptomatic recurrence
  - need for further intervention
  - functional outcomes such as cognitive function
  - change in neurological symptoms such as headaches
  - quality of life
- intermediate and longer-term safety outcomes including:
  - mortality
  - stroke or myocardial infarction
- patient selection, including:
  - symptom severity
  - frailty status
  - whether the procedure is done for a new or recurrent haematoma.

What research is needed

For MMAE alone when surgery to remove the haematoma is suitable but not chosen, more research is needed. This should be in the form of randomised

controlled trials and real-world evidence, and in populations relevant to the NHS. It should include:

- intermediate and longer-term efficacy outcomes including:
  - symptomatic recurrence
  - need for further intervention
  - functional outcomes such as cognitive function
  - change in neurological symptoms such as headaches
  - quality of life
- intermediate and longer-term safety outcomes including:
  - mortality
  - stroke or myocardial infarction
  - neurological complications such as visual loss
  - procedure or device-related adverse events or complications
- patient selection, including:
  - symptom severity
  - whether the procedure is done for a new or recurrent haematoma.

Why the committee made these recommendations

There is good quality evidence on the efficacy of MMAE with surgery to remove the haematoma for some outcomes up to 12 months. It shows that MMAE with surgery reduces the recurrence or worsening of non-acute subdural haematomas compared with surgery alone or no surgery. But there are some uncertainties about whether MMAE with surgery:

- leads to better functional outcomes and quality of life
- reduces disability and mortality in the long term.

The evidence on the safety of MMAE with surgery is limited, but does not raise any major safety concerns.

The evidence for MMAE alone when surgery to remove the haematoma is not suitable or not clinically indicated is more limited compared with the evidence for MMAE with surgery. But it suggests that the procedure is safe and

effective. Also, there is a greater unmet need for people who cannot have surgery because standard medical treatment alone could lead to poor health outcomes.

So, for these populations, MMAE can be used while more evidence is generated on its efficacy and safety.

There is very little evidence on the efficacy and safety of MMAE alone when surgery to remove the haematoma is indicated but not chosen. So, more research is needed for this population.

2 Information about the procedure

2.1 Middle meningeal artery embolisation (MMAE) involves restricting the blood supply to a non-acute subdural haematoma with an embolic agent injected into the middle meningeal artery. The procedure can be done for new or recurrent haematomas, and can be done on its own or with surgery to remove the haematoma.

2.2 The procedure is done by a trained interventional neuroradiologist, using general or local anaesthesia, under fluoroscopic guidance. A catheter is inserted into the common femoral or radial artery (or in certain rare cases, the temporal artery). A microcatheter is then guided into the middle meningeal artery. Angiography is used to select branches for embolisation. The target branches are then blocked using an embolic agent such as liquid agents, particle agents or coils. Once there is no flow in the target branches on angiography, the catheters are removed.

3 Committee discussion

The interventional procedures advisory committee considered evidence on middle meningeal artery embolisation (MMAE) for non-acute subdural haematomas from several sources. This included evidence submitted by 4 companies, a review of efficacy and safety evidence and responses from

stakeholders. Full details are available in the project documents for this guidance.

The condition

3.1 A subdural haematoma is an accumulation of blood and blood degradation products in the space between the brain and one of its surrounding membranes (the dura). This space is referred to as the subdural space. A subdural haematoma is usually caused by a head injury. But, with non-acute subdural haematomas, the cause is often a minor head injury. Symptoms usually develop more slowly compared with acute haematomas, and the blood has typically been present for weeks or months. During this time, there will also have been some changes in normal biological processes such as the formation of an inflammatory membrane.

3.2 Non-acute subdural haematomas can present with a variety of symptoms. These range from mild headaches to motor and cognition problems, and reduced consciousness. Some people may not have any symptoms at all.

Current practice

3.3 Non-acute subdural haematomas with symptoms, or with minor or no symptoms but radiological evidence of a large volume haematoma with mass effect, are usually treated with surgery. The haematoma can be surgically drained through a burr hole (burr-hole evacuation) or a craniotomy.

3.4 Haematomas are usually managed with conservative treatment if they are:

- associated with minor or no symptoms
- small in size
- any size and the risk of surgery is too high.

This involves careful monitoring and medical management such as temporarily stopping or reversing treatment with anticoagulants or antiplatelets.

Unmet need

3.5 It is common for a non-acute subdural haematoma to recur after surgical removal. When this happens, reoperation or surgical rescue is often needed. These further interventions can lead to complications such as stroke, myocardial infarction or death. Some people may be unable to start or restart anticoagulants or antiplatelets after surgery to remove the haematoma because of the risk of recurrence. MMAE could reduce the rate of recurrence and lead to better outcomes for people with non-acute subdural haematomas.

3.6 Conservative management of non-acute subdural haematomas when surgery is too high a risk or not clinically indicated can be associated with high morbidity and mortality rates. MMAE could provide another option and lead to better outcomes for these people.

Innovative aspects

3.7 MMAE is a minimally invasive procedure because the skull does not need to be opened to do it. In contrast with surgical procedures which drain the haematoma, MMAE targets the underlying source of bleeding.

The evidence

3.8 The evidence included 11 randomised controlled trials and 6 systematic reviews. Six different devices were used in the studies informing this guidance, including both particle and liquid embolic agents. The evidence is presented in the interventional procedures external assessment report. Other relevant literature is in the appendices of the external assessment report.

3.9 The professional experts, patient experts and the committee considered the key efficacy outcomes to be:

- symptomatic recurrence
- need for further intervention
- functional outcomes including cognitive function
- change in neurological symptoms including headaches
- quality of life.

3.10 The professional experts, patient experts and the committee considered the key safety outcomes to be:

- mortality
- stroke or myocardial infarction
- neurological complications including visual loss
- procedure or device-related adverse events or complications.

3.11 Six commentaries from people who have had this procedure were discussed by the committee.

Committee comments

3.12 The procedure may particularly benefit people with non-acute subdural haematomas that have recurred or that have a high likelihood of recurring. This is because it could prevent the need for additional surgical procedures.

3.13 There were differences in the eligibility criteria, severity of neurological disability, and suitability or clinical need for surgery in the populations in the included studies. More evidence is needed on patient selection and who would benefit most from MMAE.

3.14 Outcomes related to quality of life, cognitive and functional improvement, and headaches are important efficacy outcomes for people with non-acute subdural haematomas.

3.15 The committee acknowledged that there are ongoing trials and that they may also provide relevant evidence.

Equality and health inequality considerations

3.16 The risk of non-acute subdural haematomas increases with age. Older age is also associated with increased risk of falls, and with use of anticoagulants or antiplatelets.

3.17 Some people are unable to have surgery because of older age, frailty or other contraindications. These people may be thought to have a disability if their condition is likely to have or has had a substantial adverse impact on normal day-today activities for more than 12 months.

3.18 There are regional disparities in access to neurosurgery centres.

4 Committee members and NICE project team

This topic was considered by NICE's interventional procedures advisory committee, which is a standing advisory committee of NICE.

Committee members are asked to declare any interests in the technology to be evaluated. If it is considered there is a conflict of interest, the member is excluded from participating further in that evaluation.

The minutes of each committee meeting, which include the names of the members who attended and their declarations of interests, are posted on the NICE website.

Chair

Rick Body

Chair, interventional procedures advisory committee

NICE project team

Each evaluation is assigned to a team consisting of 1 or more health technology analysts (who act as technical leads for the evaluation), a technical adviser, a project manager and an associate director.

Ivan Maslyankov
Technical lead

Charlotte Pelekanou
Technical adviser

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Project manager

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