Advice Statement 004/2016 August 2016

What is the clinical effectiveness, safety and cost effectiveness of endovascular therapy using mechanical thrombectomy devices for patients with acute ischaemic stroke?

Example of stent retriever device

This advice has been produced following completion of evidence note 61 by Healthcare Improvement Scotland in response to an enquiry from the Centre for Clinical Brain Sciences, University of Edinburgh. The evidence note was based on a EUnetHTA rapid review.

Background

In 2014/15 there were 8,502 individuals treated in hospital in NHSScotland for a new stroke episode. Over 75% of cases were in patients aged 65 or older. Around 85% of strokes are ischaemic, where a blood vessel carrying oxygen to the brain becomes blocked by a thrombus (blood clot).

Current standard care for ischaemic stroke may include intra-venous (IV) thrombolysis using recombinant tissue plasminogen activator (rt-PA) within 4.5 hours of symptom onset. 10-15% of patients with ischaemic stroke receive thrombolysis each year. Endovascular therapy with mechanical thrombectomy is a similarly time limited treatment which may be used as an addition to thrombolysis or as an alternative where patients have contra-indications to thrombolysis or where thrombolysis has failed. Mechanical thrombectomy is restricted to patients who have large vessel occlusion confirmed by initial imaging scans and retrieves the clot to restore blood flow to the affected area of the brain.

Around 10-20 mechanical thrombectomy procedures are carried out on an ad hoc basis each year in Scotland. It is estimated that around 500 patients per year in Scotland could be eligible for this intervention.

At least 15 devices hold CE mark for this procedure. Recent trials are based on the use of stent retrievers which work by enmeshing the clot inside a basket before removal. All devices require similar endovascular access. The stent retriever devices used in the majority of included studies cost in the region of £3,000.

Clinical effectiveness

- Key outcomes in studies were return to functional independence at 90 days as measured by the modified Rankin Scale score and 90-day mortality.
- The maximum time specified from onset of symptoms to commencing endovascular therapy ranged from 5 to 12 hours across trials, although for most patients studied endovascular therapy was commenced within 6 hours.
- Meta-analyses of randomised controlled trials at low risk of bias indicate that early mechanical thrombectomy, as an addition to standard care, results in improved rates of functional independence at 90 days for highly selected patients with ischaemic stroke who have confirmed large vessel occlusion in the anterior circulation and undergo treatment at specialist centres.
- Limiting inclusion to five contemporary trials commencing from 2010 onwards, all of

which used imaging based patient selection and predominately stent retriever technologies, the relative risk (RR) of functional independence at 90 days was 1.72 (95% Confidence interval (CI) 1.48 to 1.99), p<0.0001, when compared with standard care alone. In these trials the proportion of patients in the intervention arm receiving IV rt-PA ranged from 68% to 100%.

Safety

- In a meta-analysis there was no statistically significant difference in all-cause mortality at 90 days between patients having endovascular mechanical thrombectomy in addition to standard care and those receiving standard care alone, RR 0.82, (95% CI , 0.60 to 1.11), p=0.20.
- In a meta-analysis there was no evidence that mechanical thrombectomy lead to a statistically significant increase in the rate of symptomatic intracerebral haemorrhage, RR 1.08 (95% CI , 0.64 to 1.83), p=0.78, or the rate of recurrent ischaemic stroke (3 trials), RR 3.09 (95% CI , 0.86 to 11.11), p=0.08 at 90 days.

Cost effectiveness

- A UK cost-utility analysis demonstrated that, compared to thrombolysis alone, mechanical thrombectomy in addition to thrombolysis is a cost effective treatment option. The incremental cost-effectiveness ratio was estimated to be £7,061 per quality-adjusted life year (QALY), based on an incremental cost of £7,431 and a QALY gain of 1.05.
- It should be noted that the trials upon which the economic analysis is based were carried out within a highly selected patient group which required rapid access to services alongside specialist imaging and interpretation. The costs of the necessary infrastructure, training and organisation of services are not included in the economic analysis.

Context

Establishing a stroke thrombectomy service in Scotland would require substantial investment and organisational change in patient transfer (road/ air ambulance), development of appropriately equipped stroke intervention centres with rapid access to neuroimaging, and an increase in the numbers of specialists trained in interventional neuroradiological techniques. Training guidelines for endovascular intervention in ischaemic stroke based on international consensus have been developed. These also specify requirements around imaging facilities http://www.ajnr.org/content/37/4/E31.long

In February 2016 a National Institute for Health and Care Excellence (NICE) interventional procedure guidance (IPG) 548 concluded that current evidence on the safety and efficacy of mechanical clot retrieval for treating acute ischaemic stroke is adequate to support the use of this procedure provided that standard arrangements are in place for clinical governance, consent and audit. A survey (n=282) undertaken by The Stroke Association in November 2015 as part of the consultation on the NICE guidance identified preventing disability to be a high priority for respondents who included stroke survivors and their friends and families.

Mechanical thrombectomy is to be considered within a forthcoming selective update of SIGN 108, Management of patients with stroke or TIA: Assessment, investigation, immediate management and secondary prevention.

The Scottish Stroke Care Audit is monitoring use of the procedure in Scotland. In England, Wales and Northern Ireland mechanical thrombectomy is monitored within the Sentinel Stroke National Audit Programme.

Conclusion
Clinical and cost effectiveness evidence supports endovascular therapy with mechanical thrombectomy using stent retrievers, in addition to standard care, for highly selected patients with acute ischaemic stroke who have confirmed large vessel occlusion, where service delivery can address the need for:

- accurate, protocol-driven patient selection based on expert multidisciplinary interpretation of non-invasive neuroimaging
- timely access to suitable neurointervention expertise and facilities
- appropriate patient numbers for development and maintenance of expertise.

There should be robust data collection and clinical audit with characterisation and monitoring of harms. This should include collecting data on recurrent stroke.

Advice context:

The status of SHTG Advice Statements is 'required to consider'.

No part of this advice may be used without the whole of the advice being quoted in full. This advice represents the view of the SHTG at the date noted.

It is provided to inform NHS boards in Scotland when determining the place of health technologies for local use. The content of this Advice Statement was based upon the evidence and factors available at the time of publication. An international evidence base is reviewed and thus its generalisability to NHSScotland should be considered by those using this advice to plan services. It is acknowledged that the evidence constitutes only one of the sources needed for decision making and planning in NHSScotland. Readers are asked to consider that new trials and technologies may have emerged since first publication and the evidence presented may no longer be current. SHTG Advice Statements are considered for review on a 2-yearly basis. The evidence will be updated if requested by the clinical community, dependent on new published reports. This advice does not override the individual responsibility of health professionals to make decisions in the exercise of their clinical judgment in the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

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Chair
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