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Commentary on: Implementing mechanical thrombectomy for acute ischaemic stroke in the UK.

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CLINICAL RADIOLOGY Commentary on Stroke Mechanical Thrombectomy

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Stroke is the third leading cause of death and the leading cause of disability in the developed world.[1] The treatment approach for acute ischaemic stroke is straightforward: restore blood flow as soon as possible and do it as safely and completely as possible. The results of the standard best medical treatment, intravenous thrombolysis (IVT) using tissue plasminogen activator delivered within 4.5 hours, in large artery occlusion (LAO) stroke are disappointing with recanalisation rates of <10% for internal carotid arteries and ≤33% for middle cerebral arteries being reported.[2] In recent studies 46-53% of patients with anterior circulatory ischaemic stroke will have a large artery occlusion.[3,4] Overall the good clinical outcome in LAO stroke with IVT therapy is only 10-40% depending on: a) the site of occlusion and b) the severity of the stroke at presentation.[5]

There have been five recently published randomised controlled trials evaluating the effects of intra-arterial clot extraction (or mechanical thrombectomy [MT]) compared with standard best medical treatment.[4,6-9] These all demonstrated significantly improved outcomes with MT. A small UK trial has demonstrated similar effect sizes.[10] Using "alive and independent" as an outcome (versus dead/disabled), the absolute benefit of MT is 20%. The number needed to treat with mechanical thrombectomy (MT) to reduce disability compared with standard medical therapy is only 2.6 patients. Mortality at 90 days and risk of parenchymal haematoma and symptomatic intracranial haemorrhage did not differ between populations.[11] However, clinical success cannot be assumed for any operator/patient from the results achieved in selected populations in specialised (mostly) neuroscience centres.[12,13]

The efficacy of MT in patients with anterior circulation stroke due to LAO is established and implementation must be the priority. This poses an obvious and major challenge to most healthcare systems and the UK NHS is no exception. To facilitate the replication of the efficient processes and networks of care required for safe and effective delivery of MT, the relevant UK professional groups developed and agreed an interdisciplinary detailed standards document for MT in 2014, which was presented on society websites.[14] These were updated in September 2015 in light of the emergence of new evidence. Subsequently the National Institute for Health and Care Excellence (NICE) has updated its own guidance to support the use of MT in stroke with qualifying statements around who selects patients for MT and who/where the procedure is performed- "*selection of patients for mechanical clot retrieval for treating acute ischaemic stroke should be done by clinicians experienced in the use of thrombolysis for stroke and in interpretation of relevant imaging. The procedure should only be carried out by appropriately trained specialists with regular experience in intracranial endovascular interventions, with appropriate facilities and neuroscience support*".[15] The UK professional consensus standards are now formally published for the first time in this edition of Clinical Radiology.[16] Accompanying the Standards document we also present a multisociety consensus training document to inform and guide the provision of the expanded workforce for MT that is urgently required. [17]

The British Society of Neuroradiologists (BSNR), the British Association of Stroke Physicians (BASP), UK Neurointerventional Group (UKNG) and NeuroAnaesthesia & Critical Care Society of Great Britain and Ireland developed the Standards guideline, which provides detail on the organisation of care, skill

mix and processes of care including inter-hospital transfers and anaesthetic support/practice to deliver thrombectomy safely and effectively. Recommendations are made for departments and individual operators and minimum performance benchmarks are indicated. The guideline was subsequently endorsed by the Intercollegiate Stroke Working Party (who oversee the National Clinical Guidelines for Stroke). These standards are not dissimilar to recently published international ones.[18]

"Training Guidance for Mechanical Thrombectomy" provides guidance for practitioners seeking training to participate in an acute ischaemic stroke thrombectomy service in the UK. It was developed by the BSNR with support, feedback and input from BASP, UKNG and the British Society of Interventional Radiologists (BSIR) at the request of the Royal College of Radiologists (RCR). It ~~has been~~ was produced in response to an anticipated shortfall in service capacity and ~~is~~ intended to supplement, rather than replace current RCR training guidance. The guidance proposes a pathway for practitioners (pre- or post-CCT) wishing to obtain RCR recognised training to perform and participate in an acute stroke MT service in the UK. Training in thrombectomy will be competency based. A wide range of competencies are required – not just catheter skills. The UK consensus guideline is more detailed and UK specific but again not dissimilar from international consensus [19]. Trainees must acquire all of the skills required to provide a MT service. This includes a comprehensive understanding of the significance of imaging findings in the context of a patient's clinical status. It is not good practice or safe for another clinician (e.g. Neurologist, Stroke Physician) to select the patient and instruct the operator, simply as a technician, when to perform a MT procedure.[20-25] Any specialist contributing to provision of a MT service should have completed a RCR recognised training process. Patients are entitled to know what training and experience a clinician has. Practitioners will need to maintain and refine their knowledge and skills as evidence and technology evolves.

Industry sponsored educational courses, web based teaching and scenario practice using simulators all provide useful educational opportunities. Whilst some of these options may contribute towards acquisition of competence, they are not, as yet, integrated into UK radiology training or recognised as qualifications by the GMC. Nor are they equivalent to training delivered in a recognised UK training program. Good quality web based or simulation based training should be accounted for and *may* become accreditable experience in the future (with a recommended limit of 10% of total required experience). [20,26]

For physicians already trained in another field wishing to undertake stroke thrombectomy a number of issues arise. They must themselves acquire the range of competencies necessary and then maintain those skills through regular practice and processes of continuing professional development. Guidance is provided on the timelines likely to be required to acquire such competencies. MT cannot be performed infrequently with the expectation that clinical outcomes will be equivalent to those achieved by experienced operators providing the entire neurointerventional area of practice in high volume centres.[13,16]

It is apparent that aside from neuroradiologists, interventional radiologists (IRs) would be best placed to acquire all the competencies most quickly – particularly those IRs reporting brain imaging regularly and already undertaking carotid interventions. Additional training would need to be supported within neuroscience centres with Neurointerventional services, be adequately intensive and dedicated. This raises issues about availability, backfill and effect on services trainees usually support and, critically, funding for such (re)training. For training purposes, a qualified (post CCT) practitioner entering neurointerventional training (e.g. consultant IR or Cardiologist) should be regarded as an experienced

trainee. It is important that a trainee, however qualified, should not be in a position to decide when their training is completed i.e. the process of determining qualification is independent from the student.

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