The skills required and how interventional neuroradiologists acquire and maintain them

Jonny Downer
Consultant Neurointerventionist
Department of Clinical Neurosciences
Edinburgh

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Outline
The skills required and how INRs acquire and maintain them:

Break down title to its components

1. Skills
2. Training
3. Maintaining expertise
4. Specific to neurointerventionists
The skills required

- **The obvious point**
  - Not just technical skills related to performing the procedure
  - Skills are also required within team and systems of care

- **Clinical skills**
  - Procedures will only be successful if the interventionist shows good clinical judgement which requires experience in treating patients with neurological disease

- **Non clinical skills**
  - Managing safety and risk and maintaining standards through robust mechanisms of clinical governance
  - Communication and collaboration

- **Medicolegal imperative that clinicians should not undertake procedures with which they are unfamiliar**
  - Taking on thrombectomy would be a risk for anyone other than INR, particularly in maintaining expertise within staffing required for 24/7 service
Technical skills

- **Neuroimaging**
  - Interpretation of diagnostic neuroimaging: CT, CTA
  - Differential diagnosis and case selection
  - Identify and locate occlusion; Best approach to treat
  - Aetiology - underlying stenosis, dissection, embolic
  - Advanced imaging techniques - CTP

- **Thrombectomy procedure**
  - Effective and safe, but ONLY in experienced hands
  - Already done by INRs, who developed the technique and devices
  - Trials done by INRs and this would be standard of care to expect the same results
  - Other INR procedures involve same devices and are in the same organ system meaning skills are transferrable and maintained
  - Experience to get the procedure done quickly and safely, to know what is possible, when to stop and how and when to push the envelope
Technical skills

- Spectrum of procedural complexity
- Dealing with complex cases
  - Tandem disease – Proximal dissection or stenosis
  - Requires experience in angioplasty and stenting both intra- and extracranial
  - Managing failure of clot retrieval and recurrent occlusion
  - Managing anticoagulation, thrombolytics and antiplatelets in stroke patients
  - Identifying and managing rare stroke aetiologies - eg Moya Moya disease or connective tissue disease with risk of damage to unaffected arterial territories
- Dealing with procedural complications
  - Dreaded and potentially fatal
  - Intracranial vessel perforation - liquid embolics
  - Rescue iatrogenic occlusive vessel injury - dissection
  - Our responsibility to be able to deal with these

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Wider skills required

- **Team skills**
  - Periprocedural care – the whole package is required to deliver good outcomes
  - Time and interhospital transfer (SAS)
  - Anaesthetics (conscious sedation, safe management of GA)
  - Scrub nurse – familiarity with devices, prep, flush, air bubbles
  - Radiographers
  - Recovery staff
  - ICU and stroke unit

- **Systems of care**
  - Time to treatment and organisational efficiency
  - Lines of communication
  - Team-working
Training

- Operator
  - INR already experienced in these procedures

- Teams
  - INR teams already used to caring for patients with neurosurgical disease

Improving skills and patient outcomes
- Continuing improvement will follow as caseload develops
- Responsibility of INR to maintain and develop expertise further
- Aim to improve on NNT of 4 from trial data
- Already part of national, european and international speciality organisations
- Training of future INRs
Maintaining expertise

- Individual and institutional caseload
  - Post Bristol scrutiny of caseload of individual operators and departments
  - Some evidence from surgical literature that sufficient caseload plays a role in achieving good outcomes
  - The challenge in ischaemic stroke will be to square that with the staffing level required to offer a comprehensive service

Projected numbers

- 658 patients received iv thrombolysis for stroke in 2012 – but increasing
- 30% of these likely to fit criteria for thrombectomy
- Estimate nationally 200-300 cases
- Individual operator ideally doing at least 50 cases per year (1 per week)
- Staffing required for 24/7 service is at least 4 operators in a given centre
- Likely not feasible to maintain sufficient experience if only occasional thrombectomy cases on call
- INR advantage of transferable procedural skills and expertise of their wider team
Summary

- INR ideally placed to expand the existing provision for endovascular treatment of haemorrhagic stroke to include the increased demand for thrombectomy.

- Challenge for INR in Scotland, and across the world, relates to working out staffing and system for service delivery.