

# THE CONTRIBUTION OF IMAGING SERVICES TO THE CARE AND MANAGEMENT OF PATIENTS WITH STROKE AND TRANSIENT ISCHAEMIC ATTACK

## 1. INTRODUCTION

The Society and College of Radiographers (SCoR) is publishing this professional guidance document to provide advice, information and support for managers and the radiography workforce involved in imaging patients with a known or suspected ischaemic or haemorrhagic stroke or transient ischaemic attack (TIA).

Experts within the field recognise that the outcomes for patients who have had a stroke are much better if there is accurate diagnosis and intervention at an early stage, with admission to, or under direct care of a dedicated stroke unit. The Stroke Association<sup>1</sup> provide information, primarily to patients, on best practice on their website <http://www.stroke.org.uk/>. Furthermore, for patients who have suffered a TIA, rapid access to a specialist TIA clinic with appropriate intervention can help reduce the likelihood of developing a full scale stroke.

National Clinical Guidelines<sup>2</sup> for Stroke prepared by the Intercollegiate Stroke Working Party and published by the Royal College of Physicians in 2004 form the basis for local policies and the National Institute for Health and Clinical Excellence (NICE) are currently working on guidelines for the diagnosis and acute management of stroke and transient ischaemic attacks which are due to be issued July 2008. The Department of Health has embarked on a programme *Improving Stroke Services* and will produce a National Strategy to modernise service provision and deliver the newest treatments for stroke. SIGN and QIS Guidelines have been developed for Scotland (see Section 5 of this document).

## 2. DEFINITIONS AND DEMANDS ON IMAGING SERVICES

A **stroke** is defined as a clinical syndrome, of presumed vascular origin, typified by rapidly developing signs of focal or global disturbance of cerebral function lasting more than 24 hours or leading to death<sup>3</sup>. There are two main causes and hence two types of stroke: an **ischaemic stroke** happens when a clot blocks an artery and a **haemorrhagic stroke** occurs when an intracerebral blood vessel bursts leading to bleeding into the brain. A **transient ischaemic attack** happens when the brain's blood supply is interrupted for a very brief time, there is a risk of a more serious stroke following a TIA.

All patients suffering stroke or TIA will need rapid access to imaging services but the initial and continuing demand on imaging services will be dependent on the type of stroke or TIA.

### ISCHAEMIC AND HAEMORRHAGIC STROKES:

All patients suffering ischaemic or haemorrhagic stroke will need rapid access to imaging and in practice this is most likely to be Computed Tomography (CT). National Clinical Guidelines for Stroke<sup>2</sup> state that imaging should be undertaken as soon as possible in all patients, at least within 24 hours of onset. Additionally, there

are circumstances when imaging should be undertaken as a matter of urgency, these are if the patient has:

- Recent history of anticoagulant treatment
- A known tendency to bleed
- A depressed level of consciousness
- Unexplained progressive or fluctuating symptoms
- Papilloedema, neck stiffness or fever
- Severe headache at onset
- Indications for thrombolysis or early anticoagulation

For patients who have had an ischaemic stroke, thrombolytic treatment may have positive effects and hence make an enormous difference to the outcome for the patient. However, giving thrombolysis for a haemorrhagic stroke would be disastrous. It is therefore imperative to obtain an accurate diagnosis of ischaemic stroke before proceeding to thrombolysis. To be effective thrombolysis must happen within three hours of the stroke occurring and this obviously challenges the health care system. Few strokes are witnessed events and by the time the patient presents to be referred for imaging it is often past the three hour window of opportunity.

Currently, thrombolysis is an option only at hospitals with a specialised stroke unit or stroke team. This service requires a robust CT service such as that offered for acute head injury. National Clinical Guidelines for Stroke<sup>2</sup> state that if the underlying pathology is uncertain, or the diagnosis of stroke is in doubt after CT, magnetic resonance (MR) imaging should be considered.

#### TRANSIENT ISCHAEMIC ATTACK:

The National Clinical Guidelines for Stroke<sup>2</sup> state that patients with TIA should be assessed and investigated as soon as possible within seven days of the incident. CT, in conjunction with carotid Doppler where appropriate are currently indicated and the new guidelines due to be published in July 2008 are likely to recommend MR imaging. Patients with more than one TIA in a week should be investigated immediately.

### **3. IMPLICATIONS FOR IMAGING SERVICES**

Current NICE guidelines<sup>4</sup> are that head injuries fitting certain criteria must have an immediate CT and hence some Clinical Imaging Departments serving Accident and Emergency units have already moved to providing an on call service which includes access to CT services, with others providing a full 24 hours a day, 7 days CT service.

Clinical Imaging Departments within specialised dedicated stroke units which support thrombolytic services are already organised to give rapid access to CT services and immediate and accurate interpretation of the images.

Whilst much of the emphasis is on plain CT services, it should be noted that additional imaging may be necessary for these patients, including plain X-ray imaging e.g. chest radiography, Computed Tomography Angiography, CT Perfusion, Magnetic Resonance Imaging including diffusion weighted scanning, and ultrasound. The demand for MR imaging may well increase in the future but the current situation is that few Clinical Imaging Departments provide a MR on-call service.

## ISCHAEMIC STROKES AND THROMBOLYSIS:

The incidence of stroke is approximately 114 per 100,000 and those suitable for thrombolysis is 2-3 per 100,000. Whilst this number is small the potential benefits for the individual patient is enormous and the potential savings to the NHS will also be significant and therefore every effort to achieve thrombolysis within three hours of the stroke must be made. This involves fast and accurate work from both the referrer and the imaging services.

The National Audit Office report of 2005 “Reducing Brain Damage: faster access to better stroke care”<sup>5</sup>, identified that the scope for potential savings as a result of more efficient practice, and using capacity more wisely including rapid imaging and admission to stroke units would be £20 million annually and result in 550 fewer deaths and 1,700 people fully recovering from their stroke.

Given that delays in referral for imaging do occur it may be that, if there is any chance of treatment using thrombolysis within the three hour time scale, then access to the CT scanner should be at the earliest opportunity. In practice, during the day this may mean completing the examination on the patient currently being imaged and then fast tracking the patient with suspected stroke into the CT scanner. Similarly, out of hours the radiographer on call could give immediate access to CT services. However, there will be times throughout the working day and particularly out of hours, when there may be multiple demands on the CT scanner and/or the radiographer. Decisions would then need to be taken locally on which patient is given priority. Managers should discuss such likely scenarios with their staff in advance and decide, in general terms, which patients are likely constitute a higher priority than others.

## TRANSIENT ISCHAEMIC ATTACK

The initial examination of choice to be undertaken within 7 days of the TIA would generally be CT, or possibly MR, in conjunction with carotid Doppler where appropriate. Patients experiencing more than one TIA in a week should be investigated immediately.

## ULTRASOUND

Ultrasound for patients who have had a suspected stroke or TIA due to an ischaemic event should be considered within the provision of imaging services for stroke and TIA. This provision for Ultrasound services should include Duplex carotid assessments carried out by suitably qualified, competent and accredited staff from vascular laboratories or clinical imaging departments. The equipment should be appropriate to ensure adequate B mode performance, colour and spectral analysis for accurate carotid duplex investigations. The carotid examination should consist of greyscale imaging, colour Doppler imaging and spectral Doppler velocity determination<sup>6</sup>. There should be an agreed local protocol for grading stenosis. The Professional Standards Committee of the Society of Vascular Technology of Great Britain and Ireland are developing national guidelines for carotid grading through a consensus document with the involvement of relevant bodies including the Vascular Society and Physiological Measurement Strategy Group. This is obviously crucial for determining which patients take the surgical route and which take the medical route. Follow up scans are necessary to monitor progressive disease.

#### INTERPRETATION OF IMAGES:

National Clinical Guidelines<sup>2</sup> state that diagnosis should always be reviewed by an experienced clinician with expertise in stroke. This presents training issues for radiologists, reporting radiographers and stroke physicians.

Interpretation of the images needs to be within acceptable time scales and to achieve this a variety of options may be considered especially when required “out of hours”:

A neuro-radiologist or stroke physician with appropriate specialist skills may not always be available and hence other solutions should be explored given that the requirements of the service are to have rapid image interpretation.

The use of teleradiology/PACS links and remote reporting may be appropriate

Post-graduate courses in interpreting CT head images have existed for some years and a suitably trained, competent and authorised advanced practice radiographer could provide the necessary report on the images. Increasing the number of advanced practitioners suitably qualified and able to interpret images would be a way of meeting the increased demands placed on imaging services. This would be within SCoR policy as described in Medical Image Interpretation and Clinical Reporting by Non-Radiologists: The Role of the Radiographer<sup>7</sup>.

#### **4. ISSUES FOR SERVICE PROVIDERS AND MANAGERS**

In view of likely increases in demand on imaging services due to guidelines which are being developed and other new/emerging expectations of imaging services, SCoR recommends that Service Managers consider the likely impact on the radiography workforce and the possible increase in imaging equipment which would be required to meet the service demand for imaging patients with known or suspected stroke or TIA. This is one of many government targets which also make a demand on imaging services. Initiatives such as the 18 week wait, cancer targets, head injury guidelines have all impacted on the service and have challenged Service Managers.

If imaging services are to meet the additional demands from stroke and TIA guidelines there will be the need for increased investment in imaging facilities to include additional equipment and radiographers. Specifically, to meet targets for rapid access it may be possible to identify a clear need for additional resources:

- CT scanner including provision for CT Angiography and Perfusion,
- MRI scanner including diffusion weighted scanning capability
- Ultrasound equipment, adequate for greyscale, colour and spectral Doppler sensitivity over a range of depths (1cm-5cms)

Additional workforce capacity would obviously be needed in the event of extension of services to 24 hours 7 days a week provision and, again, for any new installations. Such staff need to be adequately educated and trained through the College of Radiographers approved post-graduate programmes.

To achieve the need for rapid image interpretation there may well be a need for additional advanced practitioners who are trained, competent and authorised to provide reports on the images.

## **5. CURRENT INITIATIVES ACROSS THE FOUR COUNTRIES OF THE UK**

### **ENGLAND AND WALES:**

The Department of Health has embarked on a programme *Improving Stroke Services* and will produce a National Strategy to modernise service provision and deliver the newest treatments for stroke. Information on this work can be accessed at <http://www.dh.gov.uk/PolicyAndGuidance/HealthAndSocialCareTopics/Stroke/fs/en>

This Department of Health initiative *Improving Stroke Services* is likely to press for an early diagnosis and intervention approach when it makes its recommendations for service delivery. The National Imaging Board is considering detailed imaging implications of this work in England.

The National Institute for Health and Clinical Excellence (NICE) is currently developing guidance on *Stroke: The diagnosis and acute management of stroke and transient ischaemic attacks*. The work is in progress and expected to be issued July 2008.

### **SCOTLAND:**

There are published Scottish Intercollegiate Guidelines Network (SIGN) guidelines on the topic of stroke available to download from <http://www.sign.ac.uk/guidelines/published/index.html>

NHS Quality Improvement Scotland (QIS) have detailed Stroke Standards which should be adhered to in Scotland (see Standard 1). The Standards are available at: [http://www.nhshealthquality.org/nhsqis/qis\\_display\\_findings.jsp?pContentID=2766&p\\_applic=CCC&p\\_service=Content.show&](http://www.nhshealthquality.org/nhsqis/qis_display_findings.jsp?pContentID=2766&p_applic=CCC&p_service=Content.show&)

NHS QIS also have a Topic Specific Group (TSG) for Stroke as part of the Clinical Effectiveness network, the group is made up of Allied Health Professionals including a radiographer.

### **NORTHERN IRELAND:**

Department of Health, Social Services and Public Safety provides information and links on *Inequalities In The Prevalence Of Stroke In Northern Ireland* at: <http://www.dhsspsni.gov.uk/stroke.pdf>

## **REFERENCES**

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3. World Health Organisation  
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6. Board of the Faculty of Clinical Radiology, The Royal College Of Radiologists-(RCR)2005 London- Standards for Ultrasound equipment
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