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# CTA in acute stroke: short intensive training intervention is highly effective in improving radiologists' performance

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## ARTICLE INFORMATION

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**AIM:** To determine whether focussed radiology training in reporting stroke computed tomography angiography (CTA) improved diagnostic performance of general radiology specialty trainees staffing regional on call rotas.

**MATERIALS AND METHODS:** A validated case archive (VCA) consisting of 50 hyperacute stroke CTA cases was developed for a full day course on CTA interpretation. Training days were organised ensuring all local trainees had a chance to attend. The rate of major and minor amendments by neuroradiology consultants were reviewed in 252 on-call radiology trainee reports.

**RESULTS:** Before training, radiology trainees had a total discrepancy (reporting error) rate of 37%: 12% major, 25% minor. Following CTA training, the total discrepancy rate was not significantly reduced (34%) but there was a substantial reduction in major discrepancies to 4% ( $p=0.037$ ; odds ratio = 3.30, 95% confidence interval [CI]: 1.08 to 10.12).

**CONCLUSION:** An intensive training course based on a hyperacute stroke VCA significantly reduced major discrepancies in stroke CTA interpretation for radiology trainees. The ability of radiology trainees to recognise large vessel occlusions and other significant findings improved.

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## Introduction

Stroke is the second commonest cause of death worldwide affecting 6.7 million patients and representing 11.9% of all deaths.<sup>1</sup> In the UK, stroke is the largest cause of disability in adults; half of all stroke survivors are dependent on

carers with activities of daily living.<sup>2</sup> Until recently, intravenous thrombolysis (IVT) was the only available hyperacute treatment, but mechanical thrombectomy is now a proven therapeutic option for patients presenting with acute ischaemic stroke caused by proximal large artery occlusion (LAO). There have been eight recently published positive mechanical thrombectomy trials.<sup>3–10</sup> NICE (National Institute for Health and Care Excellence) has approved thrombectomy for use in the NHS (National Health Service).<sup>11</sup> Proximal LAO accounts for ~40% of ischaemic strokes<sup>12</sup> and this group of stroke patients

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present with the biggest deficits (so often present quickly) but respond least well to IVT with a disproportionately high disability burden as a result.<sup>13</sup>

Fast and accurate assessment of patients potentially suitable for acute interventional management is critical to offer the best treatment. In regional teaching hospitals, out of hours CT/CTA are provisionally reported by a general radiology (specialist) trainee. The supervising on-call neuroradiology consultant, although available for giving a second opinion at any time, will review all scans and document any disparities within 1–12 hours.

Traditional preparation for starting radiology on-call consists of the usage of teaching collections, lectures, and rotations into the different radiological specialties. In a traditional teaching file, only key images are provided, which allows many disease entities to be presented in a limited time. Simulation training enables users to experience a more real-life experience of reporting cases and using different visualisation tools (e.g., windowing, reconstructions) to accurately interpret the imaging examinations. This method of training has become widely used in interventional specialties, including interventional radiology. With digital imaging now ubiquitous, it is much easier to implement digital simulation teaching resources into diagnostic radiology. The opportunity to participate in training within a safe environment where trainees can

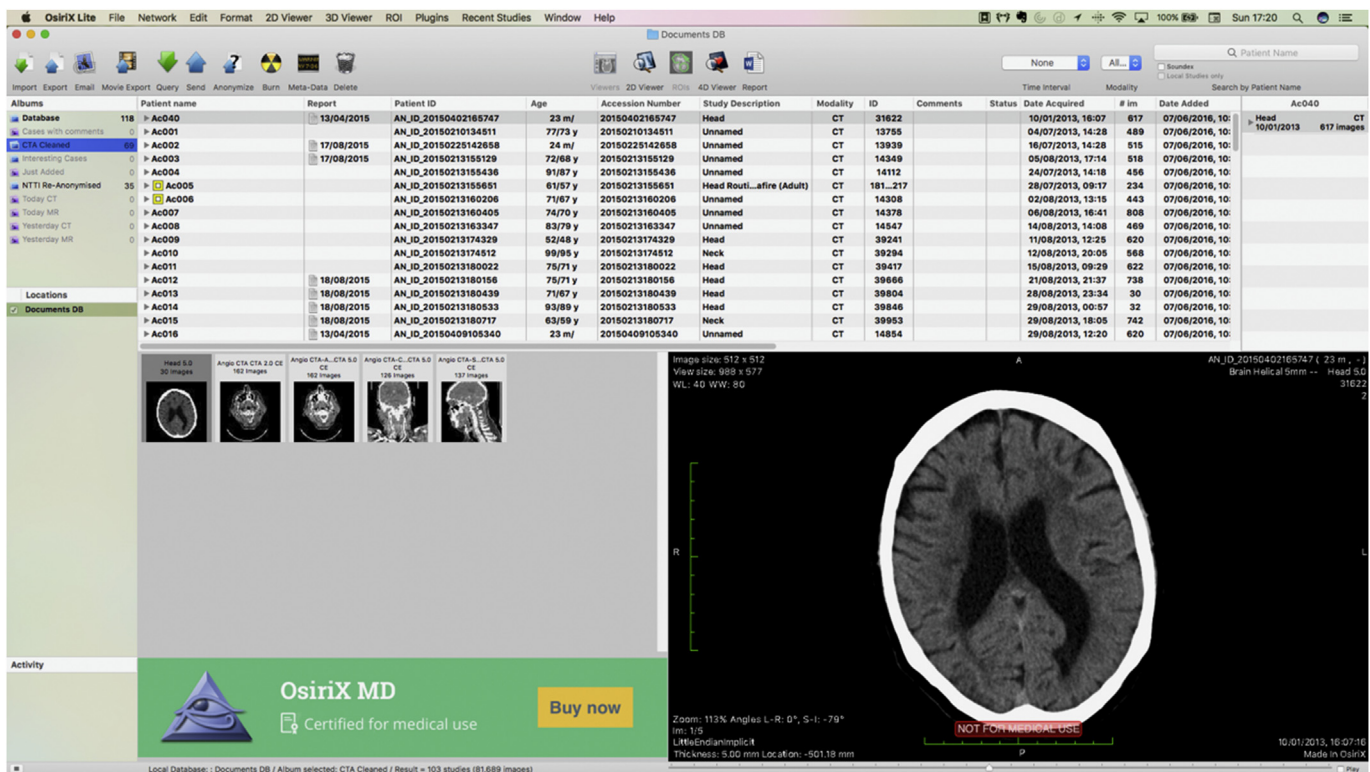
review and report entire examinations promotes confidence, especially at the beginning of on-call commitments.

The purpose of this study was to develop simulated radiology training for reviewing CTA examinations of patients presenting with hyperacute ischaemic stroke. A validated case archive (VCA) was used together with a few short presentations on relevant anatomy, the CTA technique, and CTA reporting tips to create a full day training course. The reports of the radiology trainees were then reviewed pre- and post-CTA training day to assess whether it had impacted on their reporting performance and confidence.

## Materials and methods

### Validated case archive development

As a first step, the scans of 364 patients presenting over a period of 7 months with clinical details of acute stroke symptoms were reviewed. From these, all CTA images were reviewed and assessed for their image quality. Fifty cases were subsequently selected for the development of a VCA. The intention was to have a mixture of normal scans, which would be used to practise and develop a methodology of assessing these examinations, a few cases with normal



**Figure 1** Osirix user interface. Main window with all the expected menu options at the top, including “ROI” (region of interest) and “Plug-ins”, with each one of these having further sub-menus. All the basic study functions are present in a toolbar, including import/export, anonymisation, report, search function, and these can be customised to your preferences. On the left side the “Albums” and the “Locations” as well as any current “Activity” are shown. The main database window shows the different cases available. Under this, once a case is clicked on, the quick viewer window shows the different sequences available on the left and on the right the selected series can be scrolled through for a quick overview. To open the viewer window, either double click a patient or a series from the quick viewer window.

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