



Teaching imaging to undergraduates: strategies and expectations

Tim Buckenham

In this issue of *NZMJ*, Subramanian et al¹ evaluate the level of radiology knowledge in recent New Zealand graduates. The authors endeavour to establish the level of first-hand experience and understanding of common radiological investigations among those graduates and to assess their ability to request the most appropriate, cost-effective radiological investigation for common clinical scenarios.

The authors are critical of the paucity of organised formal radiology teaching in the last year (trainee intern year) of medical undergraduate education. Their research indicates that the significant majority had observed ultrasound, CT, and angiography (72–80%), but few had observed a barium enema and an intravenous urogram (IVU) (25–28%). The authors conclude by suggesting that a well-structured radiology teaching programme, especially for those in the final year of medical school (trainee interns), is necessary and they quote the burgeoning quantity and role of imaging and the lack of postgraduate radiology education to support this thesis.

There is no question that the modern graduate needs to have a working knowledge of the actual process of an imaging investigation (both from the perspective of the patient and the clinical utility to the referring doctor), and possibly they need to have the ability to interpret the images as well. This knowledge can be obtained in the undergraduate setting by observing scans and discussing the images with radiologists and clinicians. Additional teaching regarding risk (particularly risks related to radiation and contrast media), and an understanding of the optimal imaging investigation for a particular patient in the clinical setting, is also important.

The problem that those teaching imaging face is the rapid expansion of imaging modalities. Many clinicians now have good access to MRI, volume (VCT) or multi-detector CT (MDCT), and SPECT (with PET CT not far off). This dramatic increase in the sophistication of imaging has caused some investigations to become less common with less reliance placed upon them. For example, the IVU in many main centres has been replaced by CT imaging of the kidneys and urinary tracts. Likewise, the barium enema has been largely supplanted by CT colonography, with new post-processing that allows sophisticated luminal visualisation.

Similarly diagnostic arteriography has been replaced by a combination of MRA and CTA. This may account for the small proportion of graduates who had physically witnessed a barium enema and IVU in Subramanian's paper, but more importantly reflects the growing complexity of imaging and how it is becoming more difficult for clinicians to request appropriate imaging, and to understand the advantages and limitations of these new techniques .

Viewing images in a hospital setting has become problematic for clinicians; many volume CT acquisitions produce 1200 transverse images and multiple sagittal and coronal reformats. These large files may only be reviewed on sophisticated viewers

which are often located only in the radiology department and are time-consuming to view.

Should the newly graduated clinician be expected to view such large increasingly sophisticated image files or should we be teaching the undergraduate to utilise the radiology department and its staff better? The role of radiology teaching to the undergraduate may have its highest value in introducing the medical student to the radiologists and the radiology department and developing the concept of the radiologist as part of the clinical team and an important part of the diagnostic and therapeutic patient pathway.

Many junior doctors come to the radiology department to ask about an imaging investigation and the question they pose to the radiologist is “what is the answer?” The natural reply to that enquiry, is “what is the question?” Good investigation poses a question for the imaging to answer, but the sophisticated imaging offered now often dilutes the need for good clinical input and offers an easy assessment of the patient which may replace clinical skills.

Subramanian et al are correct when they state teaching undergraduates is underpinned by two basic tenets: familiarisation with the imaging procedures and an understanding of the role of the radiologist as part of the clinical team. Whether this can be achieved by further formal teaching and examination as suggested by the authors is difficult to assess, however.

The trainee intern year is a clinical experience—radiology is learnt by clinical exposure and exists as a thread in all clinical disciplines. By using this traditional system, are we preparing graduates for work in smaller hospitals where the national shortage of radiologists is most acute and the role of the radiologist supporting the clinical team is lost? In these centres, clinical review of images is still important, and adequate teaching of interpretation of plain radiographs is important too as these often have key clinical relevance in the acute setting—but it is impractical to expect more sophisticated interpretation and well-intentioned undergraduate teaching (regarding the use of the radiology resource problematic) without local radiological expertise.

In conclusion, imaging is involved in nearly all patient groups and all clinical scenarios. It is difficult to teach imaging as a discrete entity, and most medical schools have embraced the teaching of radiology as a thread running through each clinical rotation, usually taught by radiologists. This approach may facilitate the understanding of the role of the modern consultant radiologist, the correct use of imaging, and limitations and risks associated with radiological investigation—but imaging is only going to continue in its sophistication and accessibility and maybe the time has come to call a halt on attempting to teach undergraduates interpretation of these sophisticated images and instead focus the teaching on all aspects of the correct utilisation of the radiological resource and try and limit the tendency for imaging to replace good clinical assessment.

As for the need for further formal teaching and evaluation in a crowded undergraduate programme (as Subramanian et al suggest), it is open to debate and will be hotly contested by other expanding fields.

Author information: Tim M Buckenham, Clinical Professor of Radiology and Consultant Vascular Radiologist (and a Sub-Editor of the *NZMJ*), Christchurch Hospital, Christchurch

Correspondence: Professor Tim Buckenham, Radiology Department, Christchurch Public Hospital, Private Bag 4710, Christchurch. Fax: (03) 354 0620; email: Timb2@cdhb.govt.nz

Reference:

1. Subramaniam R, Hall T, Chou T, Sheehan D. Radiology knowledge in new medical graduates in New Zealand. *N Z Med J*. 2005;118(1224). URL: <http://www.nzma.org.nz/journal/118-1224/1699>