

# Towards the appropriate use of diagnostic imaging

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*Unnecessary examinations expose patients to risk without benefit and are a threat to the effective allocation of resources*

Things aren't as they used to be. Imaging investigations are replacing the old paradigm of history-taking, physical examination and provisional clinical diagnosis.<sup>1</sup> We may blame intellectual laziness, but short consultation times in general practice, fear of litigation, and the expectations of patients all contribute to the burgeoning use of medical imaging. Unfortunately, a lack of understanding of the role of imaging in specific clinical situations leads to unnecessary imaging or imaging that is inappropriate in terms of timing or the choice of modality.

The article by Simpson and Hartrick (*page 43*)<sup>2</sup> regarding requests for thoracic computed tomography (CT) scans by general practitioners has, by the authors' own admission, certain shortcomings: for example, it was a retrospective study and the appropriateness of CT requests was judged on subjective criteria; the value of a negative test for exclusion of disease was understated. Nevertheless, the article is a useful starting point for considering the problem of inappropriate imaging investigations in a wider context.

Most radiologists are aware that diagnostic imaging is often inappropriately used. Perhaps up to a third of radiological examinations are totally or partially unnecessary.<sup>3</sup> In 2002, Hammett and Harris<sup>4</sup> suggested that it was time to reduce inappropriate test ordering, but there is little evidence of any change in practice since that time.

Unnecessary examinations expose patients to risk without benefit and are a threat to the effective allocation of resources. There are many circumstances in which there is no indication for imaging at all. Simpson and Hartrick allude to this in their article with regard to chest CT scans, but overuse of imaging of the lumbar spine in acute back pain is another example. The wrong choice of test may lead to delay in diagnosis, hazards of the test itself and the risk of false-positive results. Reducing the inappropriate use of CT is especially important, as it is the predominant cause of the marked increase in population exposure to ionising radiation in recent years. Although there is a lack of consensus on the exact degree of risk posed by medical exposure to ionising radiation, the princi-

ples of radiation protection dictate that exposure be kept to the lowest level reasonably achievable.

To reduce inappropriate use of diagnostic imaging, action is needed both by referring doctors and by providers of radiological services. Simpson and Hartrick have highlighted a specific situation relating to referral by GPs, but there are undoubtedly similar problems in hospital environments and in specialist practices.

How can GPs improve their capacity to use imaging properly and effectively? Prohibiting referrals for CT by GPs would result in unacceptable stress on specialist services, long waiting times and, probably, increased costs. Restriction of CT requests to specific clinical indications would also most likely be impractical and open to interpretation. Picano<sup>3</sup> has suggested a “radiological driving licence” for requesting doctors (with penalty points for inappropriate requests and licence withdrawal for repeated infringements) — a nice idea, but potentially difficult to administer.

Education of referrers is surely the most practical solution. Imaging technology is becoming increasingly complex and expensive. Keeping abreast of the choices of modalities may be bewildering. GPs need to call on the consultative role of radiologists more frequently and effectively to ensure that the correct test and correct test protocol are used, to be made aware of the accuracy and limitations of the test, and (armed with an estimate of the pre-test probability of a disease) to better assess the significance of the result.

Imaging guidelines based on evidence and expert consensus need to be disseminated, “marketed” and made easily accessible. Targeting the reduction of unnecessary tests in highly specific areas of general practice can be successful,<sup>5</sup> but it is uncertain whether this approach is applicable over the wide range of imaging services and clinical scenarios. Simply mailing out information is inadequate<sup>6</sup> and doesn’t guarantee accessibility or enable easy updating. The Royal Australian and New Zealand College of Radiologists (RANZCR), for example, has circulated its excellent booklet *Imaging guidelines* to GPs in the past, but the last edition appeared in 2001 (available on request at <<http://www.ranzcr.edu.au/contact/index.cfm>>). There is a need for guidelines in electronic format (such as the online publication *Diagnostic Imaging Pathways*, developed by the Western Australian Department of Health, <<http://www.imagingpathways.health.wa.gov.au>>), enabling continuous modification as new evidence appears,<sup>7</sup> and these should preferably be integrated into other computerised systems already used by GPs. Hammett and Harris<sup>4</sup> foresee the implementation of computerised order-entry systems providing guidance on test appropriateness, information on each test, and feedback on ordering patterns.

Such guidelines would enable referrers to answer specific questions in relation to clinical scenarios and individual patients: Is imaging indicated? Will it change the diagnosis? Will it change the patient’s management? Will it do more harm than good? Am I asking for the appropriate imaging and in the correct order? Is there a non-ionising alternative to an x-ray-based examination?<sup>8</sup> It behoves all clinicians to be aware of the approximate radiation dose and the attendant risk associated with the test they are requesting. Such knowledge is generally lacking.<sup>9</sup>

Radiologists, too, must take more responsibility for effective and appropriate use of imaging. The RANZCR, in its Quality Use of Diagnostic Imaging program,<sup>10</sup> is facilitating this, but individ-

ual radiologists need to take action as well. GPs need education seminars on this topic. Radiologists have a duty to ensure that radiation exposure to individuals and communities is the lowest necessary. They have a consulting role that they have been guilty of ignoring and that referrers are guilty of underutilising. Radiologists need to act as gatekeepers, vet each request and provide feedback to the referrer if the request is inappropriate. This requires the referrer to provide adequate clinical details to ensure that the appropriate imaging protocol is used (eg, high-resolution chest CT for diagnosis and monitoring of diffuse interstitial lung disease with minimum radiation exposure versus higher dose helical chest CT for malignancy or pleural disease). When CT is required, radiologists (and radiographers) need to be reminded that modern CT scanners can employ techniques to reduce patient exposure. Low-dose and ultra-low-dose techniques (including CT,<sup>11</sup> renal colic and CT colonography protocols) are often an option, but these require the active involvement and judgement of the radiologist. A marriage of knowledgeable and informative request writing, vigilant vetting of requests, and application of correct protocols will bring the enormous benefits of radiological imaging to the population in a safer manner.

**Competing interests**

Richard Mendelson is Editor of the online publication *Diagnostic Imaging Pathways*.

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