
LETTER TO THE EDITOR

The Challenge of Unnecessary Radiological Procedures

To the Editor: Medical application of ionising radiation has increased substantially over the past decades.^{1,2} In 2006, 380 million diagnostic radiological procedures were conducted in the United States.³ This figure is massive and increasing dramatically.⁴ Radiation exposure of such a large part of the population raises concerns about public safety.^{2,3} Economic implications of imaging are also a challenge for some patients.

Although ionising radiation has potentially improved diagnostic capabilities, its use is associated with the potential of malignancy, especially a lifetime risk of fatal cancer.⁵ Appropriate use of imaging can help reduce this risk. As recommended by the International Commission on Radiological Protection, any radiation dose to patients must be justified and kept ALARA (as low as reasonably achievable).⁶ Therefore it is essential not to expose patients to unnecessary radiation.

The problem of unnecessary radiological procedures has been highlighted as a main concern in scientific publications over the past decades.^{1,7,8} Unnecessary examinations can arise from procedures that are not justified and are unlikely to improve patient care.⁹ This can lead to unjustifiable costs of health care and an excessive radiation dose to the population. Evidence suggests that diagnostic X-ray imaging is performed in more than 80% of patients referred to hospitals.¹⁰ At least a third, possibly more, of radiological procedures are unnecessary and can be eliminated without compromising patient care.⁴ A study by Oikarinen et al⁸ revealed that 77% of computed tomography (CT) examinations of the lumbar spine, 36% of the head, and 37% of the abdomen were unjustified. The authors emphasised that both the referring physician and radiologists should take responsibility and decrease unnecessary examinations.⁸

To overcome this problem, referral appropriateness criteria have been proposed by regulatory organisations such as the American College of Radiology, The Royal College of Radiologists, and World Health Organization. Applying these criteria will substantially reduce overutilisation.⁹ Nonetheless referring physicians

and practitioners appear to have a limited awareness of these referral criteria and their usage is voluntary and frequently denied.^{1,9}

A broad range of factors have been identified that contribute to this overuse of medical imaging: the health system, self-referrals, defensive medicine, radiologist, patient wishes, financial motivation, lack of awareness, and availability of imaging modalities.^{1,9} Some authors have discussed these factors.^{1,11} Levin and Rao¹² reported that in 2004, unnecessary procedures due to self-referral contributed \$16 billion to annual health care costs in the United States.

Palesh et al¹¹ believe that overutilisation of health technologies is a major concern in Iran. They concluded that this is often related to the behaviour of physicians who wish to increase their profit.¹¹ Although approximately 80% of diagnoses are based on clinical findings, physicians may order imaging before the patient has been thoroughly examined. This is likely in the mistaken belief that it is easier to request imaging than waste time arguing with patients. One solution may be for the physician to proceed as if he were treating a family member, and also consider whether a certain imaging procedure will really address a clinical question.

For the past few years, reducing the radiation dose associated with CT has been highlighted.⁷ Concern about radiation-induced cancer continues to be a matter for concern in popular and scientific literature.^{2,13} The radiation dose from CT is 100 to 500 times more than that of conventional radiography.⁵ In 2007, more than 60 million CT scans were performed in the United States, including 7 million paediatric CT studies.^{2,14} This value was certainly higher in 2015. It has been estimated that 29,000 future cancers could arise due to CT examinations performed in the United States in 2007.¹³ Brenner⁷ estimated that a third of CT examinations are unnecessary. By eliminating these unnecessary CT examinations, a third of cancers could be prevented without compromising patient care.⁵ Elimination of unnecessary procedures may thus be viewed as a significant health and safety issue. For

most emergency patients however, diagnostic imaging (especially CT) is likely ordered because its omission may delay diagnosis.

Elimination of unnecessary radiological procedures is an obvious means to reduce radiation exposure for patients and health care costs. This is the responsibility of the referring physician. In addition, before imaging is ordered, the patient's medical history should be thoroughly evaluated so that duplicate imaging is avoided. Imaging should then be requested only if there is a reasonable clinical indication.

We believe that the key to elimination of unnecessary procedures is formation of a national coordination body comprising health organisations, radiological communities, medical insurance companies, and broadcasting organisations who will focus on training programmes. If referring physicians are optimally trained and follow available appropriateness criteria, the number of unnecessary procedures, health care costs, and future radiation-induced cancers in the population can be substantially reduced. Allowing expert radiographers to use their qualified judgement to reduce unnecessary views, the provision of a written list in a physician's room of common unnecessary procedures, and media training programmes to increase public awareness of the costs and potential risk associated with unnecessary procedures may be viewed as the most effective measures to minimise unnecessary radiological procedures and should be encouraged. More supervision by insurance organisations may also help. It should be emphasised that this national coordination body should have a mandate to examine compliance. It is pertinent here to note that elimination of unnecessary procedures will not be easy, but it can and should be done.

M Zabihzadeh^{1,2}, V Karami³

¹ Department of Medical Physics, School of Medicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

² Department of Radiotherapy and Radiation Oncology, Golestan Hospital, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

³ Department of Medical Physics, School of Medicine, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

Correspondence: Mr Vahid Karami, Medical Physicist (MSc), Department of Medical Physics, School of Medicine, Ahvaz Jundishapur University of Medical Sciences, Golestan Blvd., Ahvaz 61357-33118, Iran
Email: karami.v@ajums.ac.ir

DECLARATION

The authors have disclosed no conflicts of interest.

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