

## ADVANTAGE OF INAPPROPRIATE IMAGING?

To the Editor:

The exponential growth in the utilization of sophisticated imaging continues unabated. This holds true for all types of high-tech imaging tools, but the use of diagnostic computerized tomography in particular has demonstrated an exceptional increase at all settings. For example, the number of emergency room visits in the United States that included a CT examination has climbed from 2.7 million in 1995 to 16.2 million in 2007, an almost sixfold increase. This dramatic growth is multifactorial. It is driven by wide availability and rapid results providing vivid anatomic detail highly useful in confirming (or ruling out) a suspected diagnosis or suggesting an alternative explanation. However, constant time pressures and growing patient complexity in the face of waning clinical skills and confidence in their use add allure to more and more imaging, also considered by many a safe haven from malpractice litigation. Thus, it is hardly surprising that a substantial proportion of CT scans are being performed for questionable indications, do not positively contribute to patient care, and appear redundant on closer scrutiny.

In Canada, up to 30% of CT may be considered "inappropriate" [1]. It is estimated that about 45% of CT scans performed for mild head trauma could be avoided if decision guidelines were followed [2]. Of 2106 patients evaluated for syncope, 63% had CT scans, but it affected diagnosis in a mere 28 cases (2%). A recent evaluation of 200 consecutive CT examinations in young patients in Finland found that 77% of CT scans of the lumbar spine and 37% of the abdomen were unjustified. CT scans with questionable

clinical utility are much more than an escalating economic burden. They entail significant radiation exposure that may well be associated with an increase in cancer risk [2]. Oxford researchers estimated in 2004 that 700–2100 cases of cancer per year in the UK and developed countries are attributable to radiation exposure from diagnostic X-rays. Imaging may also lead to diverse adverse events, such as when prevalent false-positive findings [3] are followed by harmful repeated scanning and invasive procedures [4]. Undoubtedly, the most striking case I know of was recently reported in the *Archives of Internal Medicine*. A 52 year old woman with an atypical chest pain and low pretest probability for coronary disease was evaluated by cardiac CT angiography, which showed some plaques and led to coronary angiography. This was complicated by dissection of the left main coronary artery requiring emergency surgery and ultimately, heart transplantation.

Thus, evidence-based test ordering founded on the patient's history, clinical examination, pretest probability and test performance characteristics remains at the core of appropriate clinical practice. These methods are being taught in medical schools, residencies and continuing medical education programs in an effort to contain the rising prevalence of unnecessary, costly and harmful imaging. This is a hard task [2]. As one of many active opponents of thoughtless imaging [4], I was taken aback recently at one patient's peculiar case.

A 76 year old woman who was quite healthy despite having diabetes and hypertension fell and required surgery for a fractured humerus. One week later she tripped at home and presented to the emergency room with nothing worse than mild contusions. Her vital signs,

examination and neurologic evaluation, electrocardiogram, chest and arm X-rays, and basic blood tests were unremarkable. Nevertheless, head, chest and abdominal CT scans were ordered by the emergency room resident who probably just wanted to 'make sure' everything was all right. Head CT revealed a 2 cm meningioma in the falx cerebri. Chest CT showed multiple segmental pulmonary emboli. The abdominal scan revealed a large mass at the top of the right kidney – a renal cell carcinoma with no discernible evidence of invasion or metastasis. Thus, three imaging studies in a single asymptomatic patient, none of them indicated in the least, revealed two significant, clinically unsuspected diagnoses. Both were life threatening and yet, treatable.

I still caution my students and residents against uncritical ordering of tests. The performance of imaging in this patient's context amounts to the use of CT for whole-body screening, which is uniformly discouraged by professional societies and most radiologists. Serendipity may not have a *P* value to speak of, but in this case it saved the patient's life.

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**“To cultivate kindness is a valuable part of the business of life”**

Samuel Johnson (1709-1784), English poet, essayist, moralist, literary critic, biographer, editor and lexicographer

**“I shall live badly if I do not write, and I shall write badly if I do not live”**

Francoise Sagan (1935-2004), French playwright and novelist