

Commentary

I have chosen three articles for this edition of the literature highlights. What do they have in common? Nothing it would seem; certainly at the first glance. The first one deals with the cost effectiveness of cardiac imaging, the next with radiation exposures in trauma radiology and the last one, a somewhat philosophical piece about the value of Radiology on the overall care of patients. However if you look a little deeper you will realise that they are all related to the value addition that radiology brings to patient care. We all realise that Radiology has become central in the care of many (if not most) patients. However we as radiologists are not very good at taking on this central role. We abdicate this pivotal position by pretending that the primary responsibility lies with the referring physicians. I will write more on this at another time.

Back to our abstracts. The first abstract is about Coronary Calcium Score. At one time this was termed as the “test looking for an indication”. Articles like this one by Raman et al have helped establish its place in cardiac imaging. The authors demonstrate a cost advantage of Calcium score over stress testing for stable angina. If only the cardiologists were listening.

Ahmadinia et al quantify something that as radiologist we have long suspected. The use of “stat” imaging particularly in trauma in lieu of clinical acumen has significantly increased. This not only increases the radiation dose but also the cost of care. With the burden of injuries increasing exponentially the cost of caring for the injured is a major concern. There appears to be a considerable room for improvement in the judicious use of imaging without compromising patient care.

The last abstract looks at a measure of value of radiological science that is not usually applied. The time saved in decision-making adds value both to the quality of patient care and saves cost. This aspect also focuses on timely communication of imaging results to the patient care team. The usual standards applied to the report turn around time by various international standard setting institutions such as the American College of Radiology for stat reporting for high acuity is typically set in minutes rather than hours. As we strive to stay relevant in the evolving health care paradigm we need to try to meet these ambitious targets.

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Economic analysis of the use of coronary calcium scoring as an alternative to stress ECG in the non-invasive diagnosis of coronary artery disease

OBJECTIVE: To conduct an economic analysis (EA) of coronary calcium scoring (CCS) using a 0 score, as alternative to stress electrocardiography (sECG) in diagnosing coronary artery disease (CAD).

METHOD: A decision tree was constructed to compare four strategies for investigation of suspected CAD previously assessed in the formulation of clinical guidelines for the United Kingdom (UK) to two new

strategies incorporating CCS. Sensitivity (96%; 95% CI 95.4–96.4%) and specificity (40%; 95% CI 38.7–41.4%) values for CCS were derived from a meta-analysis of 10,760 patients. Other input variables were obtained from a previous EA and average prices for hospital procedures in the UK. A threshold of £30,000/Quality-adjusted Life Year (QALY) was considered cost-effective.

RESULTS: Using net monetary benefit calculations, CCS-based strategies were found to be cost-effective compared to sECG equivalents at all assessed

prevalence of CAD. Using CCS prior to myocardial perfusion scintigraphy (MPS) and catheter angiography (CA) was found to be cost-effective at pre-test probabilities (PTP) below 30%.

CONCLUSIONS: Adoption of CCS as an alternative to sECG in investigating suspected stable angina in low PTP population (<30%) would be cost-effective. In patients with PTP of CAD >30%, proceeding to MPS or CA would be more cost-effective than performing either CCS or sECG.

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Ahmadinia, Kasra MD; Smucker, J. Benjamin MD; Nash, Clyde L. MD; Vallier, Heather A. MD

Radiation exposure has increased in trauma patients over time

BACKGROUND: Computed tomography (CT) scans have become imaging modalities of choice in trauma centers. The purposes of this study were to evaluate the trend of radiation exposure in acute trauma patients. Our hypothesis was that radiation dosage and charges would increase over time without change in patient acuity or outcome.

METHODS: Five hundred consecutive trauma patients were retrospectively reviewed for the years 2002, 2005, and 2008. Total number of CT scans, plain radiographs, and total radiation dosage (milliSieverts [mSV]) were determined. Charges were calculated. Injury severity scores and mortality were determined.

RESULTS: The mean number of CT scans for category 1 patients in 2002, 2005, and 2008 was 1.5, 3.1, and 4.6, respectively ($p = 0.01$). This trend was similar in category 2 patients: 2.0, 3.5, 5.1, respectively ($p <$

0.01). Significant decreases in plain radiography were noted concurrently. This contributed to increased total radiation exposure to categories 1 and 2 patients over 2002, 2005, and 2008: 12.0 mSV, 23.6 mSV, and 33.6 mSV ($p = 0.02$); and 17.5 mSV, 24.1 mSV, and 37.5 mSV ($p < 0.001$), respectively. Charges for diagnostic imaging per patient also increased for categories 1 and 2 patients over 2002, 2005, and 2008: \$2,933, \$4,656, and \$6,677; and \$4,105, \$5,344, and \$7,365, respectively (all $p < 0.01$). Over the course of a year for 4,800 trauma patients treated at our hospital, this is expected to accrue additional charges of \$13 million.

CONCLUSION: The number of CT scans per trauma patient has more than doubled over 6 years, generating more radiation exposure and charges per patient, despite no change in mortality or injury severity. Judicious use of advanced imaging may control risks and costs without compromising care.



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Measuring Radiology's Value in Time Saved

Because radiology has historically not measured its added value to patient care and thus not communicated it in easily understood terms to all stakeholders, the specialty must correct this to prepare for the eventual transition from the current fee-for-service payment schedule to new value-based reimbursement systems. Given the increasing risk for marginalization, radiologists need to engage clinicians and managers to map the processes and associated costs of episodes of patient care to identify areas for providing and improving integrated diagnostic information and to measure the value thereof. In such time-driven, activity-based costing practices, radiologists should highlight how proper investments in the information generated by imaging and how radiologists' associated consultative

and coordination of services can save greater resources downstream, especially in the non-renewable resource of physician time, an increasingly scarce health care resource. Using physician time in the most efficient way will be a key element for decreasing health care costs at the aggregate level. Therefore, expressing radiology's contribution in terms of downstream physician time saved is a metric that can be easily understood by all stakeholders. In a conceptual framework centred on value, the specialty of radiology must focus more on its most important product, actionable information, rather than on imaging technologies themselves. Information, unlike imaging technologies, does not depreciate with time but rather increases in value the more it is used.