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IS CT AND MRI OVERUTILIZED?

In 1996, a study from St James Hospital followed 2068 patients, attempting to evaluate if inappropriate CT studies had been performed (i.e. not medically necessary). That study concluded that "no substantial numbers of inappropriate CTs were performed". Since then, the utilization of CT and MRI has increased tremendously in virtually all aspects of patient care and diagnosis. Controversy exists as to if there is over utilization of these modalities.

CT, in particular, has become extremely important in the evaluation of the acute patient in the outpatient, inpatient or ER setting. Utilization has increased because diagnostic yield of these tests has increased. A study presented in 2005 at RSNA showed that over a period of 1999-2004, utilization of CT and MRI in the ER of a major hospital increased from **20%** patients scanned to **87%** in the workup of acute abdominal pain. The "negative appendectomy rate" (i.e the number of surgeries performed for suspected appendicitis which yielded an alternative diagnosis and a normal appendix) decreased from 23% to 1.5% suggesting excellent diagnostic accuracy of CT. A similar study from 2005 showed increased utilization of CTA of the chest by 172% and CT C-spine by 103% with improved diagnostic accuracy as well. Then, a presentation at RSNA from 2006 showed increased utilization and diagnostic accuracy in the trauma setting.

One might expect that all this increased utilization might also increase health care costs tremendously, but there is a negative effect of improved accuracy of diagnosis and early detection of complications in the inpatient setting which overall improves costs. A study from Radiology in 2005 examined inpatients from 1996 and 2002 at a major hospital. Imaging costs of CT and MRI increased 51% in that time period per patient. Costs overall increased 55% (hospital and ancillary costs). This suggests that the total costs of imaging per patient remained commensurate with the overall cost of patient care.

CT and MRI has become the "standard of care" in the initial evaluation of patients with several suspected disease processes. This certainly includes abdominal pain, suspected brain abnormalities including acute stroke, thromboembolic disease, among many others. It is widely accepted in the physician community so much so that clinicians such as Dr Elliot Fishman (renowned radiologist) has declared "CT is the physical exam of the 21st century".

So, is there overuse of CT and MRI? Probably. One reason may be for legal ramifications. For example, the vast majority of head CTs ordered from the ER are read as normal. The inference may be that too many head CTs are ordered and there are efforts currently underway to create guidelines for the use of head CT. Nonetheless, a negative head CT can triage a patient rapidly, save costs in the ER and eliminate unnecessary admissions, not to mention avoid possible lawsuits.

Additionally, studies have suggested that the supply side of imaging centers has the most significant affect on utilization over the demand side. A study from 2004 showed that the institution of utilization review in a hospital decreased the overall utilization of CT and MRI. Therefore, there were "unnecessary" tests being ordered. There is little doubt that the abundance of imaging centers surrounding OCMMC creates an environment where too many CT and MRI studies are being performed. Increased availability will increase utilization.

In summary, increased utilization in inevitable and by and large is beneficial to patients and does not add increased costs over the savings realized by improved accuracy of diagnosis. Increased utilization increases diagnosis of serious pathology. There is also a desire and demand on the part of referring physicians for diagnostic certainty which will drive this utilization. In the near future, there will likely be new applications for CT such as large scale lung cancer screening and CT angiography of the coronary arteries in the workup of chest pain. With the proper hospital utilization review process, the increased utilization can be turned into increased advantages for both hospital and patient.

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