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Point: Diagnostic Radiation: Why Aren't We Stopping (Or at least Slowing Down)?

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Over the past 12 to 18 months I have heard from numerous sources that emergency physicians are using too much diagnostic radiation. The federal government (Biological Effects of Ionizing Radiation VII), the radiology community and several subspecialty groups are all calling for a re-evaluation of the use of medical radiation.^{1,2} And yet, we seem to be doling out diagnostic tests that expose our patients to radiation on an hourly basis, with no sign of stopping.

The proposed increase in lifetime risk for developing a solid tumor or leukemia after the radiation of an abdominal/pelvic CT scan is 1:1,000.³ Not much when you consider that the lifetime risk overall is 45%. However, there are reports of individuals receiving as much as 175 mSv (18 individual CT studies) over the course of therapy for one episode of urolithiasis.³ It does not seem to dawn on us that our diagnostic CT is going to be followed by several others as the urologist or internist follows the passage of the stone.

Another study, published in the *Journal of Trauma* last year described the typical radiation exposure suffered by a trauma patient. Study patients, described as all trauma patients arriving by emergency medical services (EMS), received an average of five CT scans and 14 plain films during their hospital stay. The expected excess cancer mortality from this exposure was 190 per 100,000. Given 2.6 million trauma patients admitted each year, the public health ramifications are obvious. The authors concluded that unnecessary CT examinations should be avoided and dose-reduction protocols and shielding should become routine practice.⁴ It has not been my experience that these recommendations have been broadly adopted.

One argument made by the academic community for so many advanced imaging studies in the setting of renal colic or routine trauma is that the CT allows us to visualize alternate or unexpected diagnoses. A recent collection of several studies detailing some 2600 patients' workup for flank pain consistent with urolithiasis and renal colic showed that there was a 12% rate of alternative findings. Most of these were adnexal masses. Really? As clinicians, can we not distinguish between

an adnexal mass and the flank pain of kidney stones? As to the dreaded aneurysm/dissection of that major artery in the belly, there were three of these diagnosed in over 2600 scans (0.1%).⁵ That 0.1% is the same as the risk of cancer we are causing by ordering so many studies.

While I realize that it is fuzzy math the truth is that with a focused history and physical we probably could do better, saving the radiation for the older patient, or those with comorbidities. Doppler ultrasound is available as are Ultra-Low-Dose CT scanners.^{6,7} These latter have been described since the turn of the millennium and expose the patient to no more radiation than a KUB (0.69 mSv) with a sensitivity and specificity EXACTLY the same as the typical CT scan. We don't push for a change in technology because it's difficult, expensive and time consuming.

The truth is it's easier to order a CT. We don't need to examine the patient and we don't have to take any risk. But that's not the art of medicine as we were taught, it's the art of lawsuit-aversion and it is irresponsible.

And we don't get any help. The radiologist won't perform a cone-down view or a limited study when you just need a little information because that puts *them* at risk. So even though we only need to see C6-T1, they insist on performing an entire cervical spine CT scan because they are afraid of being found liable for missed injuries in parts of the spine not even imaged. And how many patients with a classic presentation for acute appendicitis go to the OR without first receiving mandatory "radiation therapy"?

Ironically, there was a recent article from the United Kingdom where CT scan was recommended as the "newer and better" technology that should replace intravenous urogram.⁸ For some reason, the medical community in Britain has decided to make the same mistake we Yanks did...leave behind a perfectly sound imaging technology and replace it with one that provides limited information about function in favor of relatively meaningless information about the size and composition of the offending stone.⁸ The oath that I took in medical school stated that I "will neither give a deadly drug to

anybody who asks for it, nor will I make a suggestion to this effect." We prescribe the deadly drug of unnecessary radiation on a daily basis, so truly, why aren't we stopping?

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REFERENCES

1. Amis ES, Butler PF, Applegate KE, Birnbaum, SB, Brateman SF, Hevezi JM, Mettler FA, Morin RL, Pentecost MJ, Smith GG, Strauss KJ, Zeman RK.
American College of Radiology White Paper on Radiation Dose in Medicine
J Am Coll Radiol. 2007; 4:272-284.
2. Baum NH, Dowling RA. Ensuring patient safety: practical steps to take now; a staff that stays healthy and is aware of in-office hazards means safer patients. Urology Times, 1/1/2008.
3. Katz SI, Saluja S, Brink JA, Forman HP. Radiation dose associated with unenhanced CT for suspected renal colic: impact of repetitive studies. Am J Roent. 2006; 186:1120.
4. Tien HC, Tremblay LN, Rizoli SB, Gelberg J, Spencer F, Caldwell C, Brenneman FD. Radiation Exposure from Diagnostic Imaging in Severely Injured Trauma Patients. Journal of Trauma. 2007; 62:151-156.
5. Ahmad NA, et al. Incidental diagnosis of diseases on un-enhanced helical computed tomography performed for ureteric colic. BMC Urology. 2003; 3:2.
6. Geavlete P, Georgescu D, Cauni V, Nita G. Value of duplex Doppler ultrasonography in renal colic. European Urology. 2002; 41:71-78.
7. Kluner C, Hein PA, Gralla O, Hein E, Hamm B, Romano V, Rogalla P. Does ultra-low-dose CT with a radiation dose equivalent to that of KUB suffice to detect renal and ureteral calculi? J Comput Assist Tomogr. 2006; 30:44-50.
8. Chowdhury FU, Kotwal S, Raghunathan G, Wah TM, Joyce A, Irving HC. Unenhanced multidetector CT (CT KUB) in the initial imaging of suspected acute renal colic: evaluating a new service. Clinical Radiology. 2007; 62:970-977.