

## PET/MRI versus PET/CT for Whole-Body Staging.

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The study by Martin et al. (1) comparing PET/MRI and PET/CT imaging suffers from a number of methodologic concerns. Most importantly, all patients underwent PET/CT scanning first and PET/MRI scanning next. It is known that many malignant lesions will continue to increase target to background FDG uptake with delayed imaging (2-3). This methodologic flaw could have been mitigated by randomly alternating the order of PET/CT and PET/MRI. The absence of such randomization biases the outcome of this comparison in favor of higher sensitivity for the PET/MRI scans. The authors did not comment as to how many of the additional 155 lesions identified by PET/MRI were due to improved conspicuity in the PET images, as shown in Figure 5B and 5E, vs. improved soft tissue characteristics, as seen in Figure 3. The case in Figure 3 was from a patient with prostate cancer, for which FDG PET is known to be less sensitive (4), and for which PSMA-labeled PET tracers will afford improved sensitivity vs FDG PET imaging (5). Next, why were the 2,686 non-whole body PET/MRI studies, representing 2.6 times more subjects than the whole-body studies, excluded from comparison? Were these also due to “technical problems” with the MRI exam? Next, of the 29 lesions (2.9% of the total) found only by PET/MRI that were associated with a correction in the TNM stage, how many of these could have been expected to significantly alter the patient’s treatment outcome had the initial PET/CT results been relied upon? The authors have stated that the use of PET/MRI reduced the average radiation dose by 36% ( $3.9 \pm 1.3$  mSv) compared to PET/CT scans using low-dose CT technique. If minimizing radiation dosimetry were a priority advocated by the authors, it is unclear why more than 80% of patients in the study underwent full-dose and not low dose CT scans. The question could be asked as to the expected outcome benefit associated with an average 3.9 mSv reduction in absorbed dose by using PET/MRI in the targeted population of cancer patients, let alone in any patients (6). Finally, it is unlikely that favorable cost benefit could be justified for more widespread use of PET/MRI in lieu of PET/CT, based on the small incremental improvement of lesions detected by PET/MRI as reported in this study.

## References.

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