Debate: Clinical Utility of MRI-PET in Oncology
Contra-MR-PET
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The concept of clinical utility is somewhat ambiguous. Often, utility is defined as how well clinicians appreciate the information provided by a test or perceive it as useful. However, in an increasingly budget-constrained environment, it is critical that the information provided by a test has a clear impact on patient outcome and is cost-effective. Thus, when considering the clinical utility of a new technology, it must be clear that there are considerable benefits provided above and beyond what existing methods can provide and/or that the same benefits are provided for less cost. Even for a technology like genomic mapping, which has decreased in cost over the past decade at a more than logarithmic pace and has a myriad of potential areas of impact, the unique benefits must be demonstrated. Thus, for a technology like PET-MRI, which adds to what are already considered to be the high cost of imaging tests, it is essential that the unique benefits are unambiguous.

Both MRI and PET have demonstrated clinical utility in oncology. MRI is widely recognized for staging and following treatment response in several cancers. FDG (2-[^{18}F] Fluoro-2-deoxy-D-glucose) PET is widely recognized as an effective method for detection of distant metastases in staging or restaging of several cancers. However, due to its widespread availability, lower cost and short scan time, CT is the most commonly used imaging method in oncology.

PET-CT scanners were first produced commercially over a decade ago and are now widely available. In addition to improving lesion localization by coregistering metabolic and anatomic information, CT easily provides information needed for attenuation correction of the PET data and image acquisition is fast and operationally straightforward. While CT exposes patients to an additional radiation dose, radiation exposure is is not a concern in most cancer patients and methodologies to minimize radiation exposure continue to develop. MRI offers an alternative means of providing anatomical information with more soft-tissue contrast and without added radiation dose. However, attenuation correction is not straightforward and image acquisition is slower, operationally more complex and more expensive. It is noted that there is potential for improvements such as using MRI for motion correction, but it is not clear that these improvements would impact clinical utility.

Based on current evidence, one must conclude that the unique benefits simultaneous acquisition of MRI and PET add to the clinical utility of MRI and PET in oncology are very limited.

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