Whole-body magnetic resonance imaging: a viable alternative to positron emission tomography/CT in the evaluation of neoplastic diseases

Ressonância magnética de corpo inteiro: uma alternativa viável a tomografia por emissão de pósitrons/TC na avaliação de doenças neoplásicas

To the Editor:

Whole-body magnetic resonance imaging (WBMRI) is a fast, reliable, safe and accurate means for detecting disease throughout the body. It is a novel and promising imaging technique that can have high sensitivity in the detection of tumors.

The advantages of WBMRI have been shown in a number of recent articles. These studies have demonstrated that a screening MRI protocol can detect various disease processes with an accuracy that is almost equal to that of a variety of equivalent "gold standard" diagnostic tests. The main results of these articles are summarized below:

- In lung cancer, WBMRI was successfully used with diffusion-weighted imaging for M-stage assessment in patients with non-small cell lung cancer (NSCLC), with an accuracy that was equivalent to that of (18) F-fluoro-2-deoxyglucose positron emission tomography (FDG-PET) with CT.[1]
- The accuracy of an MRI scan was significantly higher than the quantitative and qualitative sensitivities of a PET/CT scan on a per-patient basis for N-stage assessment of NSCLC patients ($p < 0.05$).[2]
- In the assessment of distant metastatic spread, WBMRI was highly sensitive and had advantages over PET/CT, especially in tumors that frequently spread to the liver, bones or brain.[3]
- For the imaging of pediatric tumor patients for whom multiple follow-up examinations might be required, WBMRI is very attractive as a radiation-free alternative.[3]
- For the staging of hematologic diseases, such as multiple myeloma, WBMRI has proven to be highly accurate; it also allows for the precise assessment of bone marrow.[3]
- Similarly to PET/CT, MRI can also quantitatively measure a response to treatment.[4]

Since integrated PET/CT provides greater efficacy in staging using the tumor, node, and metastasis classification than do conventional staging methods, it seems to be the preferred first-line staging tool for lung cancer. However, MRI has played an increasingly important role in this setting. For example, in patients with pulmonary adenocarcinoma, the sensitivity of a brain MRI scan in the detection of metastasis has been shown to be significantly higher than is that of a PET/CT scan (88% vs. 24%; $p < 0.001$).[5]

The cost of imaging studies is also an important consideration. Because of the nature and complexity of the imaging system and intrinsic maintenance costs, MRI is unavoidably a more expensive test than is CT. However, it is more affordable than is PET/CT. In addition, the machinery of PET/CT has more components, and the requirement for radiopharmaceutical products to be continuously produced makes PET/CT intrinsically more expensive. Due to the imaging system itself, MRI is also a safer modality than is PET/CT. Unlike the ionizing radiation used in CT, the powerful magnetic field and radiofrequency energy of MRI have not been shown to cause cancer or fetal abnormalities. It is important to note that, although X-rays are known to cause cancer, the exact risk of developing cancer from being submitted to CT scans or repeated CT examinations is unknown.[6]

Therefore, the constant improvements in equipment and development of new protocols might soon make MRI a preferred replacement for PET/CT as a first-line cancer staging tool. This method has been shown to provide similar results to PET/CT, as well as being less expensive and safer.

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