Diffusion-weighted magnetic resonance imaging may identify candidates for alternatives to lobectomy for early stage lung cancer

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In the evaluation of patients with known or suspected lung cancer, current practice for most thoracic surgeons is to perform computed tomographic scanning, usually combined with positron emission tomographic imaging. Magnetic resonance imaging (MRI), if used at all, is relegated to evaluation of the brain and occasionally the adrenal glands in select patients. As technology evolves, however, we would be wise as thoracic surgeons to “stay in touch” with developments in MRI, as there are increasing data documenting its utility in many areas of lung cancer management.

MRI with diffusion weighting (DW) has been shown to be of value in assessing mediastinal nodes, with studies showing negative predictive values that rival positron emission tomographic imaging (as high as 94%).¹ MRI with DW has also been shown have relatively high accuracy and a high specificity in excluding malignancy in patients with a solitary pulmonary nodule.² The ability of MRI with DW to identify areas of high cellularity has also led to its use in the more accurate guidance of percutaneous needle biopsies³ and prediction of response to stereotactic body radiotherapy.⁴ In some centers, MRI is also being used in combination with positron emission tomographic imaging, eliminating the radiation exposure from the attenuation-correction computed tomographic scan.

The results of the study by Nomori and colleagues⁵ published in this issue of the *Journal of Thoracic and Cardiovascular Surgery* may well add another very important reason to consider MR imaging as part of the management of patients with lung cancer. In a study of 145 patients with early stage lung cancer, they performed MRI with DW, visually classifying the patterns as homogeneous and heterogeneous and further classifying the former as faint or dark according to the signal intensity. In all, just less than 20% of the tumors

were classified as having the faint homogenous pattern, representing a group of patients who universally had well-differentiated adenocarcinomas, mostly T1a, and no evidence of pleural invasion or lymph node involvement.

The significance of their findings lies in the current explosion of interest in alternatives to anatomic lobectomy in patients with small peripheral lung cancers. With widespread application of computed tomographic screening protocols and the shift in histologic type from squamous cell to adenocarcinoma that has been occurring, the numbers of these patients will likely increase substantially in the coming years. Alternative approaches to the traditional lobectomy and node dissection include video-assisted thoracoscopic surgery with sublobar resection and, perhaps more notably, stereotactic body radiotherapy and thermal ablation techniques. The Achilles' heel of these approaches is the inability to date to address fully the potentially involved nodes. The frequency of clinically occult nodal disease in stage 1 lung cancer has been estimated between 15% and 20%^{6,7} (19% in the series of Nomori and colleagues), and this has been used as justification for continued performance of the criterion standard lobectomy approach. This may change, however, if a reliable means of predicting the absence of node involvement can be proved. The study by Nomori and colleagues may be an important step in this direction.

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