Problem solving Non Small Cell Lung Cancer Staging with MRI

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BACKGROUND: Lung cancer is the leading cause of cancer death worldwide with a less than 20% of patients reaching their five year survival after diagnosis.[1] The prognosis for this disease has not been impacted in the last 20 years by chemotherapy; however modification of survival curves has been shown by early surgery and removal of smaller cancers before they spread.[2-3] With the recent revision of the TNM system for NSCLC staging,[4] resectabilty is determined by having Stage IIIA or less. Currently, Computed Tomography (CT) with co-registered Positron Emission Tomography (CT/PET) scanning is the modality of choice for the pretreatment staging of these patients. What specific combination of therapies is chosen varies depending on that patient's TNM stage and performance status. The role of Magnetic Resonance Imaging (MRI) in the setting of the presurgical staging of NSCLC is evolving, but this modality can be considered as an option for determining disease extension beyond the lung parenchyma in those cases where CT/PET is equivocal due to motion or misregistration.

PURPOSE: The purpose of this educational exhibit is to review the following: (i) revisions to the TNM staging of lung tumors, (ii) indications for MRI and (iii) MRI sequences and findings that help determine resectabilty and prognosis in patients with intrathoracic malignancy.

OUTLINE OF CONTENT:

1. What is new in the Seventh Edition of TNM Staging of Lung Tumors?
2. When is MRI necessary to determine extra-pulmonary extension?
    a. Heart
    b. Great vessels
    c. Brachial plexus
    d. Spine
3. What MRI sequences are used to assist with lung tumor staging?
    a. Heart
        i. CINE balanced steady state free precession
        ii. CINE myocardial tagging
        iii. Black blood
        iv. Contrast-enhanced T1 with fat separation methods
    b. Great vessels
        i. Contrast-enhanced magnetic resonance angiography
        ii. Dark blood
        iii. Contrast-enhanced T1 with fat saturation
    c. Brachial plexus and spine
        i. T1/T2
        ii. Contrast-enhanced T1 with fat saturation
        iii. Diffusion Weighted Imaging

SUMMARY: Although CT/PET is the primary imaging modality for the staging of NSCLC, MRI has a complementary role in helping to determine the correct staging and thus the resectabilty of certain thoracic tumors. Knowledge of the changes in the new TNM classification will improve the reviewers understanding of when MRI is appropriate for the accurate staging of these patients.

REFERENCES

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