Conclusions: Statistically significant improvements to 3He-MRI to planning CT image registration can be achieved by using a dedicated imaging protocol that enables both 3He-MRI and planning CT to be acquired with similar breath holds and body position. Improved image registration accuracy will be beneficial when performing functionally-weighted IMRT planning.

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P1-067 **Imaging and Staging Posters, Mon, Sept 3**

Prognosis of small adenocarcinoma of the lung based on thin-section CT and pathological preparations

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Background: We have previously reported that tumor opacity in the mediastinal window image in thin-section CT (TS-CT) is associated with prognosis of lung adenocarcinoma of 20 mm or smaller in diameter. However, pathological investigation of the tumor opacity in the mediastinal window has not been performed in detail. To investigate the relationship between imaging and pathological findings, the solid lesion in the pathological preparation observed under a magnifying glass (SLP) and tumor opacity in the mediastinal window image (TOM) in TS-CT were compared. The relationships of SLP and TOM with relapse were also investigated.

Methods: The subjects were 115 patients with a lung adenocarcinoma of 20 mm or smaller in diameter who underwent surgical resection at the Kanagawa Cancer Center between January 1997 and October 2003. Pathological and imaging findings for these patients were re-investigated in this study. Patients with bronchioloalveolar carcinoma (BAC) that was undetectable in the mediastinal window image were excluded. SLP was defined as follows: 1) regions with alveolar collapse, 2) regions accompanied by destruction of the alveolar framework, and 3) regions described in 2) accompanied by collagen fibrotic foci. The maximum diameters of the tumor and SLP were measured in the pathological preparation, and the proportion of the maximum diameter of the SLP to the maximum tumor diameter was calculated as the pathological ratio. In TS-CT, the proportion of the reduction in the TOM maximum diameter to the maximum diameter of the tumor opacity in the lung window was calculated as the reduction percentage. Correlations between the maximum SLP and TOM diameters and between the pathological ratio and the reduction percentage were investigated, and the association of relapse with SLP, TOM, the pathological ratio, and reduction percentage was also examined.

Results: Strong Pearson correlations were noted between the maximum TOM and SLP diameters (correlation coefficient: 0.852, $p<0.0001$) and between the reduction percentage and pathological ratio (correlation coefficient: 0.895, $p<0.0001$). The maximum TOM and SLP diameters were not significantly associated with relapse. However, the incidence of relapse was significantly higher in patients with a reduction percentage of less than 50% by log-rank test; no relapse occurred in patients with a reduction percentage of 50% or higher. Similarly, the incidence of relapse was significantly higher in patients with a pathological ratio of less than 50% by log-rank test; no relapse occurred in patients with a pathological ratio of 50% or higher in the pathological preparation.

Conclusions: Use of the reduction percentage in TS-CT to classify lesions into two groups with different prognoses is valid based on the pathological investigation. Therefore, measurement of the reduction percentage and pathological ratio may allow prediction of cases of small adenocarcinoma of the lung with a good prognosis.

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Comparison of RECIST, WHO criteria, and serum CEA for evaluation of tumor response to chemotherapy in non-small cell lung cancer

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Background: Response evaluation criteria in solid tumor (RECIST) is widely used as a standard method for evaluation of tumor response in clinical oncology. RECIST is based on uni-dimensional measurement of target lesions and is simpler than WHO criteria which are based on bi-dimensional measurement. In clinical practice, we sometimes use serum tumor markers to estimate tumor response as well, particularly when measurement of tumor size is difficult. The aim of this study is to compare WHO criteria, RECIST, and serum carcinoembryonic antigen (CEA) level for evaluating tumor response to chemotherapy in non-small cell lung cancer (NSCLC).

Patients and Methods: During an 11-year period from 1995 through 2005, 24 NSCLC patients with high serum CEA level (> 5ng/ml) at presentation were retrospectively analyzed. They underwent pulmonary resection after induction chemotherapy. In each case, we compared histological response of tumor response of resected specimens.

Results: Using WHO criteria, nine and 15 patients achieved partial response (PR) and no change (NC), respectively. With RECIST, PR was seen in 11 patients, stable disease (SD) in 13. Concordance between WHO and RECIST was 83 %. When we compare CEA level before chemotherapy with that obtained after chemotherapy, CEA levels significantly decreased in PR group defined by WHO criteria [26.3 (median) ng/ml to 4.3 ng/ml, $P = 0.008$, wilcoxon t test] or RECIST [17.3 ng/ml to 4.4 ng/ml, $P = 0.004$, wilcoxon t test]. On the contrary, in patients whose responses were NC or SD, there was no significant difference [16.8 ng/ml to 9.9 ng/ml, $P = 0.24$, 16.8ng/ml to 19.6 ng/ml, $P = 0.24$, respectively]. In comparison of CEA level with histologic response, CEA decreased significantly in patients in whom less than one-third of tumor cells were viable [17.3 ng/ml to 4.4 ng/ml, $P = 0.008$, wilcoxon t test] but not in whom more than two thirds of tumor cells were viable [16.8 ng/ml to 7.9 ng/ml, $P = 0.06$, wilcoxon t test]. From