WHAT IS THE PROGNOSTIC VALUE BY THE COMBINATION OF MORPHOLOGICAL AND METABOLIC DATA IN LUNG CANCER PATIENTS? A COMPLEMENTARY STUDY OF CT AND PET/CT

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BACKGROUND-AIM

Lung cancer is a tumor linked with a poor prognosis. Its staging is usually performed by using computed tomography (CT) of thorax and abdomen. In the last 10 years, the introduction of PET/CT with FDG has significantly improved the clinical staging, especially for the detection of mediastinal lymph nodes and distant metastases (bone, adrenal glands, etc...). The prognostic meaning of FDG PET/CT has been extensively studied and published in literature, but the additional value derived from the association of both metabolic and morphological data are missed. The aim of the present study was to determine the influence both of CT features and of metabolic parameters by FDG PET/CT on overall survival (OS) in patients with primary lung cancer.

METHODS

Between 2008 and 2010, we reviewed CT and PET/CT images of 130 patients (mean age 69.5 years, range 50-83 yrs) with lung cancer before any treatment. The period between two imaging modalities ranged between 1-3 months. Chest CT findings of nodules documented were location, pleural effusion, extra nodules, margins, density, lung parenchyma, bronchogram, thinking pleural, excavation, lymph nodes and metastases. Both qualitative and semiquantitative data were recovered by FDG PET/CT. The correlations among CT, PET/CT and OS were obtained using Kaplan Meier survival analysis. A Cox-regression analysis was used to determine the variables independently correlated with prognosis.

RESULTS

At CT images, the majority of patients showed a solid nodule (n=112; 86.2%) located in upper left lobe (38.5%). Moreover, a centrolobular emphysema and loco-regional lymph nodes were reported in 58 (44.6%) and 52 (40%) of cases, respectively. At PET/CT examinations, lymph node metastases were detected in 44 (33.8%). Maximum SUVs of primary and lymph node disease were 13.4±6.6 and 8.2±4.6, respectively. After a follow up period of 20±18 months, 24 patients were alive and 106 dead. Age, stage, nodule density, lymph nodes and metastases at CT were significantly different between alive and dead patients (chi-square test, all p<0.05), being higher in the second group. None of the semiquantitative PET data was significantly different between dead and alive subjects. At Kaplan Meier analysis, the association of nodule density, pulmonary parenchyma, metastases at CT were predictive of OS (log rank, all p<0.05); while only the presence of distant metastasis at PET was negatively correlated with prognosis (p=0.080). At multivariable analysis, lung parenchyma and distant metastases at CT were independently correlated with a worse prognosis (HR>1.00; both p<0.05).

CONCLUSION

The presence of abnormal lung parenchyma, solid lesions and concomitant distant metastases at CT images influences the survival failure. Semiquantitative data by PET/CT has demonstrated limited prognostic value in this subset of patients. Perhaps a combined morphological/metabolic marker should be defined.