



Title	Predictors of treatment outcome in patients treated with radical chemoradiotherapy for stage III Non-small Cell Lung Cancer
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PREDICTORS OF TREATMENT OUTCOME IN PATIENTS TREATED WITH RADICAL CHEMORADIOTHERAPY FOR STAGE III NON-SMALL CELL LUNG CANCER

BACKGROUND: Chemoradiation has been well established as standard treatment for stage III non-small cell lung cancer (NSCLC). Previous studies have shown that the tumour size as well as its metabolic activity predict treatment outcome after definitive treatment for early-stage disease. We would like to investigate if there are any clinical and metabolic predictors of treatment outcome for stage III NSCLC after chemoradiation. **PATIENTS AND METHODS:** 56 consecutive patients (46 males and 10 females) treated with radical concurrent chemoradiation for their stage IIIA (n=21) and IIIB (n=35) (AJCC 7th edition) unresectable non-small cell lung cancer between July 2006 to February 2012 were retrospectively reviewed. 42 patients had positron emission tomography with integrated computed tomography (PET-CT) scan performed at diagnosis. Of which 14 patients also had PET-CT scan after induction chemotherapy and before concurrent chemoradiation. All received concurrent chemoradiation +/- induction chemotherapy and adjuvant chemotherapy. Primary study endpoint was progression-free survival (PFS). Secondary endpoints include overall survival (OS), response rate and toxicity. Predictors of PFS and OS were investigated in subgroup analyses. **RESULTS:** The mean age of this cohort was 59.1 years (range 32-77). The dose of radiotherapy ranged from 40.0 to 70.2Gy (median dose 63.0Gy). 48 (85.7%) patients received induction chemotherapy (mean 2.5 cycles) and 17 (30.4%) patients received adjuvant chemotherapy (mean 2.0 cycles). The median PFS and OS were 13.6 months and 53.5 months respectively, after a median follow up of 38.3 months. Overall response rate was 71.4%. PFS advantage was demonstrated in stage IIIA vs stage IIIB (median 38.6 months vs 13.0 months, HR: 0.438, 95% CI: 0.209-0.917, p=0.025), N-stage N0-N2 vs N3 (median 16.4 months vs 10.5 months, HR: 0.415, 95% CI: 0.201-0.855, p=0.014) and borderline advantage was seen in maximum standardized uptake value (SUVmax) of positive nodes <8 vs ≥8 (median 22.6 months vs 12.6 months, HR: 0.465, 95% CI: 0.198-1.091, p=0.072). OS advantage was revealed in stage IIIA vs stage IIIB (not reached vs 22.7 months, HR: 0.245, 95% CI: 0.085-0.706, p=0.005) and SUVmax <8 vs ≥8 (not reached vs 18.5 months, HR: 0.354, 95% CI: 0.122-1.029, p=0.047). Cox proportional hazard model showed that stage IIIA (p=0.011), planning target volume (PTV) (p=0.003) and N0-N2 disease (p=0.007) were predictors of PFS while stage IIIA (p<0.001) and SUVmax of positive lymph nodes <8 (p=0.029) were predictors of OS. Dose of radiotherapy was neither a predictor of PFS and OS. Grade 3 radiation fibrosis was noted in 5 (8.9%) patients. There was no treatment-related mortality. **CONCLUSIONS:** Our study result was highly comparable with previously published international results. Stage IIIA disease and SUVmax of positive lymph nodes <8 are significant predictors of OS. PET-CT scan at the time of diagnosis is useful in stratification of patients into favorable and unfavorable groups.