AbstractID: 10635 Title: Volumetric response analysis during chemoradiation as predictive tool for optimizing treatment strategy in locally advanced unresectable NSCLC

Background

In the treatment of locally advanced non-small cell lung cancer (LANSCLC) there is a trend towards concurrent chemoradiation because of the advantage on local control and survival (Auperin et al, IASLC 2007). Chemoradiation however is burdened by a marked increase in toxicity. This calls for a more patient-tailored approach, trying to identify those patients that benefit from a more aggressive approach. We studied the feasibility of measuring volumetric changes in the primary tumor on tomotherapy MVCT, correlating with local response to assess its usefulness in reliable, early detection of patients with poor local therapy outcome.

Methods

Fifteen consecutive patients with stage III, inoperable LANSCLC were treated using helical tomotherapy. They were monitored for acute toxicity and evaluated with daily MVCT imaging. The tumor volume was delineated daily in a standardized way and the volumetric changes were fitted to a negative exponential resulting in a regression coefficient (RC). Local response evaluation was done using PET-scan.

Results

The mean volume decrease (±standard deviation) was 77% (±18%). With a mean treatment time of 42 days this treatment schedule resulted in a mean decrease of 1.83%/day. Out of the 13 evaluable patients 7 developed a metabolic complete remission (MCR). The mean RC of the patients with MCR is 0.050 versus a mean RC of 0.023 in non-responders (p=0.0074). Using a proposed cut-off value for the RC of 0.03 80% of the non-responders will be detected correctly while misclassifying 16.4% of patients who eventually achieve a MCR.

Conclusions

The RC derived from volumetric analysis of daily MVCT is prognostic and predictive for local response in patients treated with chemoradiation for a locally advanced NSCLC. Because of the possible toxicity of chemoradiation, MVCT can be a tool for the implementation of patient-individualized treatment strategies.