Abstract: We reviewed our initial institutional experience with the use of stereotactic hypofractionated radiation therapy (SFRT) in patients with stage I non-small cell lung cancer (NSCLC). Thirty patients with inoperable stage I non-small cell lung cancer due to a severe chronic obstructive pulmonary disease (COPD) and/or chronic heart disease (Eastern Cooperative Oncology Group (ECOG) performance status of 0-2) were treated between December 2000 and October 2003 with SFRT in curative intent. Infiltration of locoregional lymph nodes and distant metastases were ruled out by computerized tomography (CT) scan of the brain, thorax, and abdomen, and by whole body FDG-positron emission tomography scan in all patients. Total RT doses ranged from 24.0 to 37.5 Gy, given in 3-5 fractions to the 60% isodose encompassing the planning target volume. Immobilization was carried out by a vacuum couch and a low-pressure foil. The clinical target volume was the tumor as it appeared in lung windowing on lung CT scan. Organ movements (caused by breathing; range, 6-22 mm) and reproducibility of patient positioning in the couch (range, 3-12 mm) were calculated by sequential CT and orthogonal films. The individual values were taken into account as a safety margin for the definition of the planning target volume (PTV). The median follow-up of living patients is 18 months (range, 6-38 months). As maximum response, there were 10
(33%) complete responses (CRs) and 14 (47%) partial responses (PRs), resulting in a total response rate of 80%. Stable disease was observed in 6 (20%) patients, while no patient experienced progressive disease. During follow-up, 2 (7%) local recurrences were observed (after 17 and 18 months, respectively). Of 5 (17%) patients who developed distant metastasis, 1 patient developed it in liver (3 months), another one in brain (6 months), and another one in the lung (36 months), while 2 patients developed it in mediastinal lymph nodes (after 8, and 11 months, respectively) only. Of 9 (30%) patients who have died, only 3 (10%) died of cancer, while 6 (20%) died of cancer-unrelated or unknown causes. Acute side effects were mild and affected 9 (33%) patients during the RT course (fatigue being the most frequent one in 6 patients). There were 22 acute events occurring in 19 (63%) patients during the first 3 months post-SFRT, the most frequent one being pneumonitis observed in 14 (46%) patients. However, there was only one (3%) grade 3 acute toxicity and no patient experienced greater than grade 3 toxicity during this study. One (3%) patient experienced rib fracture as the late event. SFRT is a feasible and safe treatment method in inoperable patients with stage I NSCLC having reduced lung capacity. Longer follow-up is necessary to get robust data on late toxicity as well as survival.