

## Survival and Recurrence Rates Following SBRT or Surgery in Medically Operable Stage I NSCLC

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**Background:** Surgery is the standard of care for early-stage non-small cell lung cancer (NSCLC), with stereotactic body radiotherapy (SBRT) reserved for patients who are not surgical candidates or decline surgery. The role of SBRT for medically operable early-stage NSCLC is not defined. We hypothesized overall survival (OS), lung cancer-specific survival (LCSS), progression free survival (PFS), and recurrence rates following SBRT or surgery in medically operable patients with Stage I NSCLC from the Veterans' Affairs Health System (VAHS) would be equivalent.

**Methods:** Medically operable patients diagnosed with Stage I NSCLC between 2000-2020 from the VAHS, determined by an FEV1 or DLCO > 60% of predicted and Charlson comorbidity index (CCI) of 0 or 1, treated with SBRT or surgery were identified. SBRT patients were propensity score matched for age, diagnosis year, sex, race, smoking status, tumor stage, FEV1, and CCI in a 1:1:1 ratio (SBRT:lobectomy:sub-lobar resection). OS, LCSS, and PFS were compared using log-rank and Kaplan-Meier analyses. PFS was calculated as the time from treatment start to recurrence or death, whichever occurred first. Local recurrence was defined as any new lung tumor, regional as spread to intrathoracic lymph nodes, and distant as spread beyond these sites. Hazard ratios were calculated using Cox regression. Recurrence was compared via a chi-squared test.

**Results:** 103 patients were included in each cohort. 97% of patients were male, 86% were white, and 89% were diagnosed from 2011-2020. 82% of patients had a CCI of 0 and the mean percent predicted FEV1 was 88%. 52% of SBRT patients received 50-60 Gy in 5 fractions and 69% of sub-lobectomy patients were treated with a wedge resection. Median follow-up was 4.32 years. For all patients, 5-year OS was 51% (95% CI 46-57%). After matching, OS, LCSS, and PFS were significantly worse with SBRT compared to either surgical cohort (Table 1). Regional recurrence was significantly higher following SBRT (15.5% vs 6.8% or 4.9%;  $p < 0.05$ ), but there was no significant difference in local (28.2% vs 21.4% or 21.4%;  $p > 0.05$ ) or distant recurrence (10.7% vs 9.7% or 13.6%;  $p > 0.05$ ) when compared to lobectomy or sub-lobar resection, respectively.

**Conclusions:** In medically operable patients, OS, LCSS, and PFS following either lobectomy or sub-lobar resection were superior to that for SBRT for Stage I NSCLC, likely due in part to higher regional recurrence following SBRT. This suggests that pulmonary function test results and comorbidity calculations alone are insufficient to define a cohort of medically operable patients suited for SBRT. These data support trials investigating strategies to overcome regional recurrences seen with SBRT.

**Table 1.** Hazard ratios (95% CIs) for OS, LCSS, and PFS for SBRT with respect to each surgical cohort,  $p < 0.05$  for each.

Cohort	OS	LCSS	PFS
SBRT vs lobectomy	2.08 (1.47, 2.95)	2.28 (1.39, 3.73)	1.97 (1.41, 2.75)
SBRT vs sub-lobar resection	1.59 (1.14, 2.22)	1.97 (1.21, 3.20)	1.45 (1.05, 1.99)