issues. Among these patients, 56% of the tumors were tested by DNA sequencing or pyrosequencing (vs 25% of the overall population), 76% of the patients were never-, former-, or light-smokers (vs 45% of the overall population), and 32% of the tumor samples were needle biopsies/cytology (vs 21% of the overall population). The false-positive rate may have been contributed to by possible over-representation of cytology samples, meaning inadequate tumor samples, or by use of the less sensitive DNA sequencing or pyrosequencing methodologies that had inadequate mutation analysis to detect mutation.

Among the 191 patients overall who were *EGFR* mutation positive, 30.6% of Japanese patients (86 of 281) and 11.6% of European patients (105 of 903) were positive. The exon 19 deletion was found in 51.3% (n=40) of Japanese patients and in 54.5% (n=54) of European patients. The L858R mutation only was found in 47.4% (n=37) of Japanese patients and 28.3% (n=28) of European patients. *EGFR* mutation-positive status was significantly correlated with female sex, ADC histology, never-smoking status, and Japanese ethnicity (all $P<.001$).

EGFR mutation status was the largest driver of therapy choice. The most common first-line treatment decisions for all *EGFR* mutation-positive patients were gefitinib, erlotinib, and afatinib; *EGFR* mutation-negative patients most commonly received pemetrexed, radiation therapy, carboplatin, and cisplatin.

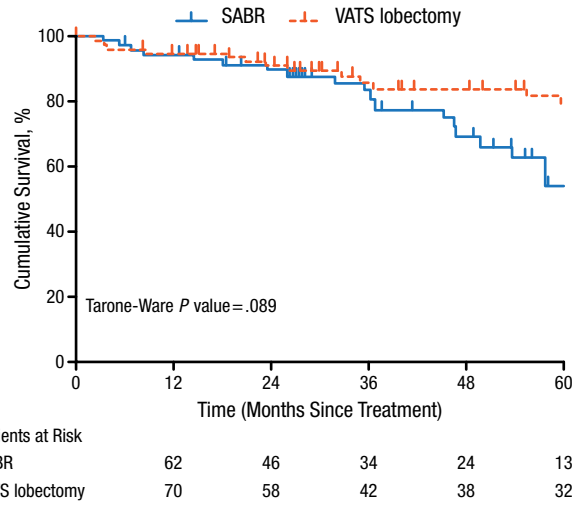
Although practices for both tissue/cytology and plasma samples require improvements, these real-world data from the large, observational ASSESS study suggest that ctDNA may be feasible and suitable for analyzing *EGFR* mutations. The overall concordance of *EGFR* mutation status was 89%.

Hints of Better Survival With Surgery Than Radiation Therapy in Stage I NSCLC

Written by Eleanor Mayfield

Surgical resection is the primary approach to the treatment of stage I non–small cell lung cancer (NSCLC). American College of Chest Physicians evidence-based guidelines [Howington JA et al. *Chest*. 2013] recommend the use of a minimally invasive surgical approach such as video-assisted thoracoscopic surgery (VATS) lobectomy in stage I disease. Nonsurgical approaches such as stereotactic body radiation therapy (SBRT), also known as stereotactic ablative radiation therapy (SABR), may offer an alternative to surgery. No prospective randomized trials comparing surgery with SBRT have been published.

Figure 1. Cumulative Survival in Patients With Stage I NSCLC After Surgery or SABR



NSCLC, non–small cell lung cancer; SABR, stereotactic ablative radiation therapy; VATS, video-assisted thoracoscopic surgery.

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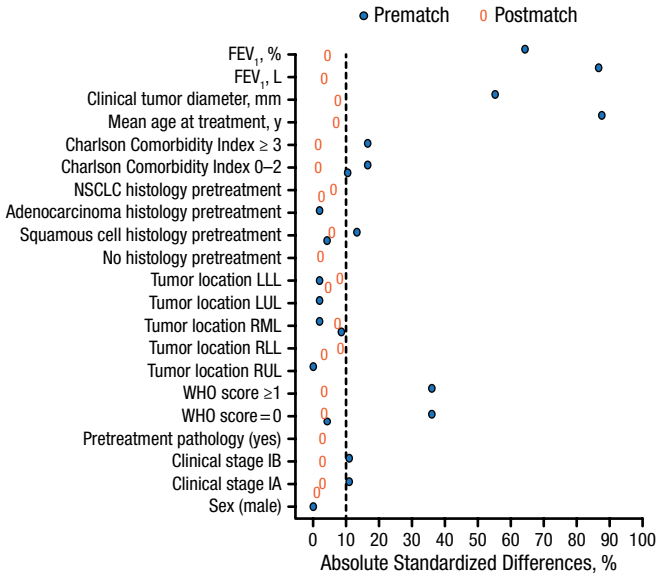
Gaetano Rocco, MD, National Cancer Institute, Pascale Foundation, Naples, Italy, discussed a poster by Sahar Mokhles, MD, Erasmus University Medical Center, Rotterdam, the Netherlands, reporting the results of a retrospective, propensity-score matching cohort study that compared clinical outcomes in patients with stage I NSCLC treated with surgery (VATS lobectomy or thoracotomy) vs SBRT [Mokhles S et al. *Ann Oncol*. 2015], with a primary outcome of overall survival. Propensity-score matching, where a propensity score difference of 0.20 was used as the maximum caliper width, generated a cohort of 73 patients treated with surgery and 73 treated with SBRT.

Median follow-up was 49 months for the surgery group and 28 months for the SBRT group; to correct for differences in follow-up time, the investigators compared survival curves using the Tarone-Ware test. Overall survival in the surgery group was 95% at 1 year and 80% at 5 years, compared with 94% at 1 year and 53% at 5 years in the SBRT group ($P=.089$; Figure 1). Although the survival difference between the 2 groups was not statistically significant, after 3 years there seemed to be better survival in surgically treated patients.

Absolute standardized differences for measure covariates were assessed to evaluate covariate balance across the groups, with results visualized using a Love-plot (Figure 2).

Prof Rocco further discussed the grouping together of patients undergoing VATS lobectomy and SBRT, noting

Figure 2. Love Plot for Baseline Covariates Between Surgery and SABR Groups



FEV_1, forced expiratory volume in the first second of expiration; LLL, left lower lobe; LUL, left upper lobe; NSCLC, non–small cell lung cancer; RLL, right lower lobe; RML, right middle lobe; RUL, right upper lobe; SABR, stereotactic ablative radiation therapy; WHO, World Health Organization.

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that these patient groups can have different results. He mentioned a recently published retrospective comparison of long-term outcomes in a single-center cohort of propensity-matched patients with stage I NSCLC who were treated with either VATS lobectomy (n = 41) or SBRT (n = 41) [Hamaji M et al. *Ann Thorac Surg*. 2015], in which survival rates varied significantly.

In response to questions posed by Prof Rocco and other discussants, Dr Mokhles, author of the poster under discussion, stated that 57% of surgically treated patients in the propensity-matched cohort and 74% of those treated with SBRT had T1 disease. Because the pathologic stage was not known for patients treated with SBRT, no concordance rate by pathologic stage could be established between the 2 groups. Every recurrence was confirmed with biopsy or ^{18}F fluorodeoxyglucose–positron emission tomographic (FDG-PET) imaging. Staging of disease in the SBRT group was generally performed by computed tomography or FDG-PET scanning rather than by endobronchial ultrasonography.

In conclusion, data from this propensity-matched cohort study showed a trend toward overall survival as greater with surgery than with SBRT in patients with stage I NSCLC. Prospective randomized clinical trials should further investigate the clinical outcomes with these 2 treatments.

Diffusion-Weighted Imaging: Superior to FDG-PET at Identifying Pulmonary Malignancy?

Written by Eleanor Mayfield

Diffusion-weighted imaging (DWI) is a type of magnetic resonance imaging that makes it possible to identify malignancies by measuring differences in the diffusion of water molecules among tissues [Wu LM et al. *Magn Reson Imaging*. 2013]. Whether DWI is superior to fluorodeoxyglucose positron emission tomography (FDG-PET) at distinguishing malignant from benign pulmonary nodules and masses (PNMs) is uncertain. Jean-Paul Sculier, MD, Institut Jules Bordet, Brussels, Belgium, discussed a poster by Katsuo Usuda, MD, PhD, Kanazawa Medical University, Kanazawa, Japan, which described a study designed to compare the diagnostic performance of DWI and FDG-PET in distinguishing malignant from benign PNMs and clarify the advantages and disadvantages of these imaging modalities [Usuda K et al. *Ann Oncol*. 2015]. The investigators used both modalities to assess 143 lung cancers, 17 metastatic lung tumors, and 29 benign PNMs.

Using a receiver operating characteristic curve, the optimal cutoff value (OCV) of the apparent diffusion coefficient (ADC) value for diagnosing malignancy was determined to be 1.44×10^{-3} mm^2/sec. PNMs with an ADC value equal to or less than the OCV were assessed as positive for malignancy; PNMs with an ADC value higher than the OCV or that could not be detected on DWI were assessed as negative for malignancy. On this basis, 128 true positives, 19 true negatives, 32 false negatives, and 10 false positives were identified with DWI; 112 true positives, 19 true negatives, 48 false negatives, and 10 false positives were identified with FDG-PET. The sensitivity of DWI (80%) was significantly higher than that of FDG-PET (70%) for malignant PNMs ($P = .0389$). Prof Sculier said that by using Bayesian analysis, he determined that the positive likelihood ratio for malignant vs benign PNMs was 12.8 for DWI and 11.2 for FDG-PET.

Interestingly, Prof Sculier said that as the percentage of bronchioloalveolar carcinoma in adenocarcinoma increased, the sensitivity of FDG-PET decreased. He also noted that under the revised 2011 international multidisciplinary lung adenocarcinoma classification system [Travis WD et al. *J Thorac Oncol*. 2011], the designation of bronchioloalveolar carcinoma was discontinued and replaced by 5 new classification categories.

PET scanning is not valuable when the result of a chest x-ray is suspicious for cancer, Prof Sculier stated. He noted that the Fleischner Society recommendations