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(P42) Does Modified Frailty Index Predict Outcomes in Stage III Non-Small Cell Lung Cancer Treated with Concurrent Chemoradiotherapy?

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Background: Age and frailty from associated comorbidities significantly influence choice of therapy in locally-advanced non-small cell lung cancer (NSCLC). Performance status (PS) has been demonstrated as a predictor of outcomes, while also influencing choice of therapy. In surgical patients (pts), frailty as measured by the modified frailty index (mFI) has been associated with worsening morbidity and mortality. There is very limited data on using mFI in the non-surgical cancer population.

Objectives: In a cohort of stage III NSCLC population, we aim to investigate the utility of an 11-factor mFI in addition to age and PS to predict oncological outcomes.

Methods: We retrospectively analyzed 97 stage III NSCLC pts treated with concurrent chemoradiotherapy (CRT) between 2015-2019. An 11 factor mFI score was calculated based on the following variables: ECOG score ≥ 2 , impaired sensorium, diabetes, chronic lung disease, myocardial infarction within 6 months, history of heart failure, coronary/cardiac disease, HTN on medication, history of transient ischemic attack, stroke with deficits, and peripheral vascular disease. Kaplan-Meier (KM) method with log-rank test was used to estimate overall-survival (OS), progression free survival (PFS), and freedom-from local failure (FFLF). Logistic regression was performed for toxicity (grade 2+ and 3+), with patients stratified by mFI score (non-frail vs frail with mFI score 0-2 vs ≥ 3 , respectively), median age (< 67 vs ≥ 67), and ECOG PS (0-1 vs ≥ 2).

Results: The median age of the cohort was 67 years (range 50-87), Caucasian (73%), with adenocarcinoma (51%). 53%, 41%, and 6% had stage IIIA, IIIB, IIIC, respectively. The median mFI score for the entire cohort was 2 (range 0-7). When stratified by mFI score (0-2 vs ≥ 3), there was no statistically significant difference in median RT dose (60 Gy each), use of consolidation chemotherapy (53% vs 40%) or use of consolidation immunotherapy (30% vs 23%). At a median follow-up of 17 months, KM estimated median OS for the entire cohort was 21 months (0-81 months). When stratified by mFI score, there was no significant difference in 2-yr OS (45.7% vs 49.6%, $P=0.81$), PFS (30.1 vs 35.3%, $P=0.91$), and FFLF (77.2% vs 81.3%, $P=0.66$). While age was not a significant predictor of 2-yr OS, PFS, and FFLF, lower PS (0-1 vs ≥ 2) was associated with improved 2-yr OS (50.8% vs 30.0%, $P=0.01$) and PFS (33.2% vs 20.0%, $P=0.03$), but not FFLF (77.9% vs 83.3%, $P=0.45$). Stratification by mFI, ECOG, and age was not predictive of the development of grade 2+ toxicity, severe grade 3+ toxicity or radiation pneumonitis on univariate and multivariate logistic regression.

Conclusions: Contrary to results from surgical series, our retrospective analysis did not demonstrate utility of mFI in predicting risk of toxicity or survival/local failure in pts with stage III NSCLC treated with curative chemoRT. Future efforts will need to explore the utility of ECOG PS, mFI, and other metrics to help select patients and predict outcomes.

(P43) Early Outcomes and Toxicity with Concurrent Chemotherapy and Hypofractionated Radiation Therapy in Patients with Non-Small Cell Lung Cancer

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Background: Definitive hypofractionated radiation therapy (RT) has demonstrated improved oncologic outcomes in patients with non-small cell lung cancer (NSCLC). However, there remain concerns regarding toxicity, and the optimal integration of accelerated RT with concurrent systemic chemotherapy is unknown.

Objectives: We aimed to evaluate the outcomes and toxicities of patients treated with definitive hypofractionated accelerated RT (HART) with concurrent chemotherapy.

Methods: We retrospectively reviewed patients with Stage II-IV NSCLC who underwent definitive HART with concurrent chemotherapy from 2012 to 2021 at our institution. HART was defined as doses greater than 2.2 Gy per fraction and radiation was delivered using intensity modulated radiation therapy without a clinical treatment volume expansion or elective nodal coverage. Cumulative incidence of locoregional recurrence (LRR), and distant metastases (DM) were calculated from the time of completion of RT with competing risk analysis. Univariable analysis was conducted to identify predictors for pneumonitis. Overall survival (OS) was analyzed using Kaplan-Meier.

Results: A total of 50 patients were identified. Median follow-up time was 15 months (range 0-97 months). Median age was 68 years (range 34-80 years); 40% were female. 62% of the patients had pulmonary disease at baseline. Two (4%) patients had stage II, 37 (74%) stage III, and 11 (22%) had stage IV disease. Median RT dose was 65 Gy (range 49.5-69 Gy), and median dose per fraction was 2.75 Gy (range 2.4-3.5 Gy fractions). The most common systemic therapy used was carboplatin with paclitaxel (56%). Median OS of the cohort was 42 months (95% confidence interval [CI] 30-not reached). The 1-year cumulative incidence of LRR and DM was 7.5% (95% CI 1.9-18.4%) and 32.7% (95% CI 19.0-27%), respectively. The median lung V20, lung Dmean, was 15.44% (range 0.32-29.47%) and 9 Gy (range 2.4-16.0 Gy), respectively. The median heart V30 and heart Dmean was 1.5% (range 0-76.1%) and 4.2 Gy (range 0.3-35.1 Gy), respectively. The median esophagus Dmax and esophagus V60 was 56.7 Gy (range 6.1-72.6 Gy) and 0% (range 0-29.4%). The most common acute grade 1-2 toxicities were esophagitis (44%) and fatigue (22%). No acute grade 3-4 toxicities were observed. Six patients (12%) had their concurrent chemotherapy held. Pneumonitis was observed in 16% of patients and there were no cases of late cardiac toxicities attributable to treatment. Mean lung dose, lung V20 and fraction size were not associated with pneumonitis on univariable analysis.

Conclusions: In select patients in whom we could achieve low doses to organs at risk using highly conformal image guided techniques, definitive HART with concurrent chemotherapy achieved excellent local control with low toxicities. These results are being used to inform a prospective study on the safety and efficacy of HART with concurrent chemotherapy for select NSCLC patients.

(P44) Is Prophylactic Cranial Irradiation Necessary in Stage I-IIA Small Cell Lung Cancer Patients? A Single Institution Experience

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Background: The advent of screening chest computed tomography (CT) for high-risk patients has increased the patient population presenting with early-stage small cell lung cancer (SCLC). While surgical resection continues to be standard of care, stereotactic body radiation therapy (SBRT) is an option for non-surgical candidates. Although the effectiveness of PCI in patients with limited stage SCLC has been well established, decreasing the brain metastasis incidence from approximately 70% to 30%, the role of PCI in early-stage SCLC (T1-T2) has not been fully elucidated. This study reports our experience omitting PCI in early-stage SCLC.

Objectives: This study reports our experience omitting PCI in early-stage SCLC.

Methods: Fourteen patients with early-stage SCLC, nine patients with clinical stage I (T1) and five patients with stage IA (T2) SCLC, ranging in age from 54-81 years old, treated with surgical resection or SBRT

from July 2015 to May 2021 at our institution, were retrospectively reviewed. Positron emission tomography (PET) was used in the staging of 93% of patients. All patients had initial negative brain MRI and opted not to receive PCI. 71% of the patients had brain scan surveillance for follow-up. Risk factors including age, gender, and tumor size, were analyzed for overall survival (OS), loco-regional recurrence (LRR), and distant metastasis (DM) using the Log-rank test.

Results: With a median follow-up of 13 months (range 2-63), none of our patients developed metastases to the brain. Adjuvant chemotherapy, with a mean of 4 cycles (2-6) was administered to 13 out of 14 patients (92%). The 2-year OS, LRR and DM estimates were 47% [95% CI (0.14, 0.75)], 57% [95% CI (0.19, 0.82)], and 51% [95% CI (0.17, 0.77)], respectively. The OS and the frequency of LRR were not found to be correlated with age, gender, or tumor size. DM was significantly higher in males vs females ($P=0.016$).

Conclusions: Our experience in patients with Stage I-IIA SCLC treated with surgery or SBRT did not demonstrate any development of brain metastases. As PCI carries long term risks of neurotoxicity, close surveillance with regular brain imaging may be a reasonable alternative. Adjuvant systemic therapy remains an important component of treatment.

(P45) A 3.5 Year Clinical Experience of a 0.35T MR-Linac System: A “Game Changer” for Radiation Oncology?

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Background: Adoption of magnetic resonance-guided radiation therapy (MRgRT) has increased in recent years. The 0.35T MR-Linac is currently the only clinical device that provides intrafraction cine-MR imaging, automated soft tissue tracking, automatic beam exclusion gating, and on-table adaptive replanning. These unique abilities can reduce toxicity while also allowing for safe dose escalation in fewer fractions compared to CT-based radiation therapy.

Objectives: We report on a single-institution clinical experience using MRgRT on a 0.35T MR-Linac system over the past 3.5 years.

Methods: We reviewed patterns of utilization at our institution of patients treated on a 0.35T MR-Linac between April 2018 and December 2021. On-table adaptive replanning began in September 2018. No patient was treated with implanted fiducial markers. Treatments were preferentially in breath hold, or otherwise free breathing gating, and therefore an internal target volume (ITV) was never used. Setup margins (SM) were typically isotropic 3 mm, or otherwise 5 mm.

Results: We evaluated 415 patients treated to 483 lesions. Median age was 69 years (range 7-92 years). The most frequently treated sites were pancreas ($n=135$; 28%), lung ($n=102$; 21%), abdominal/pelvic lymph nodes ($n=72$; 15%), liver ($n=49$; 10%), adrenal gland ($n=44$; 9%), prostate ($n=16$; 3%), and esophagus ($n=13$; 3%). The greatest relative increase in utilization was for adrenal gland metastases (2018-2019: 5%; 2020-2021: 12%). The median prescription dose was 50 Gy in 5 fractions. Compared to 2018-2019, patients in 2020-2021 were more often treated in 1-6 fractions (85% vs. 74%) and less often > 15 fractions (17% vs. 5%). The percentage of delivered fractions that were adapted sharply increased from 7% in 2018 to 24% in 2019, 40% in 2020, and 40% in 2021.

Conclusions: Despite offering multiple advanced photon therapy systems and pencil beam proton therapy at our institution, we have seen remarkable growth of our MRgRT program. Our MR-Linac has predominantly been used for ablative, coarse hypofractionated treatment of mobile tumors, especially those in challenging anatomic locations (e.g., pancreas, lymph nodes) for which on-table adaptive replanning offers substantial clinical benefit by ensuring that organ-at-risk constraints are met despite potentially large interfraction and intrafraction anatomic changes.

(P47) Integrating Virtual Contouring into a Clinical Elective in Radiation Oncology: A Single Institution Experience

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Background: Despite radiation oncology being a critical component of cancer care, few students are exposed to the field and its technical elements as part of their undergraduate medical education.

Objectives: The purpose of this project was to evaluate student comfort with contouring after completion of a virtual curriculum as part of a 2-week clinical elective.

Methods: Clinical students were enrolled in a 2-week elective that integrated both clinical activities and self-directed learning through virtual contouring modules. The virtual curriculum was designed around three modules available on EduCase. A survey was conducted after completion of the modules to assess their efficacy in increasing understanding of basic contouring skills. To assess differences in pre- and post-course survey results, we used Student's two-sided paired t-test.

Results: 10/13 students completed the survey at the end of the course. 8 students had no prior exposure to contouring software. Overall, there was a significant increase in comfort level using radiation planning software ($P=3.4e-3$) as well as ability to find relevant contouring references ($P=2.6e-4$). Knowledge of the anatomy and contouring principles also improved for the three modules: eye and brain ($P=8.5e-5$), high grade glioma ($1.7e-4$), and head and neck nodal stations ($4.0e-4$).

Conclusions: Integration of a self-directed virtual contouring experience into a clinical elective was helpful for improving student understanding of this technical aspect of radiation oncology.

(P48) Leading Self Through Communication: A Novel Skills Workshop

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Background: Competency in communication has been a focus of the Accreditation Council for Graduate Medical Education (ACGME) (Batalden P, Health Aff 2002), especially at the patient bedside (Makoul G, JAMA 2003). Residency programs have more recently sought to integrate these and other leadership competencies into training as formalized curricula using various frameworks (Blumenthal D, Acad Med 2012). A commonly used framework is the Emotional Intelligence Model, which has “leading self” as one of the core tenets (Goleman D, Harv Bus Rev 2017). Our residency program has developed a unique longitudinal leadership development course to incorporate such training (Song E, J Cancer Educ 2021). As a new iteration of this curriculum, we implemented a novel skills workshop in two communications scenarios.

Objectives: Within our longitudinal leadership development course that meets monthly, we sought to improve communication skills conveying complex information outside of traditional clinical and scientific fora to a lay audience.

Methods: We collaborated with clinical faculty with formal communications and media training, as well as with faculty from the university Communications Department for this three-part workshop. Residents were first assigned to deliver a five-minute grant “elevator pitch” to a simulated Foundation Board via videoconferencing. These pitches were recorded and reviewed with expert commentary in the second session. The final session required residents to go “on camera” with a simulated news reporter to answer questions about their research for a lay audience.

Results: Communications faculty provided immediate feedback on delivery (tone, pitch, body language), while clinicians focused on appropriateness of content. The recorded pitches were then reviewed by the residents with additional clinical faculty. On qualitative interviews, participating residents noted unconscious mannerisms,