

## Conference Abstracts

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# Investigation of CEA as a Biomarker for Prognostic Utility and Using Cardiac Troponin to Assess Radiation Therapy-Induced Cardiotoxicity in Patients with Lung Cancer Undergoing Thoracic Radiation

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### BACKGROUND

Lung cancer is the leading cause of cancer-related death in both men and women. Early detection and treatment, as well as continued advancements in treatment, provide an opportunity to decrease mortality. Advancements in the use of biomarkers have informed clinical decisions, and research is ongoing to profile both diagnostic and prognostic indicators in lung cancer. We sought to evaluate carcinoembryonic antigen (CEA) and cardiac troponin as biomarkers for prognostic utility and radiation therapy-induced cardiotoxicity, respectively, in patients with lung cancer undergoing thoracic radiation. The therapeutic index of cancer therapy can be defined as the correlation of tumor control versus normal tissue injury. Advances in targeted therapy resulting in elongated progression-free survival and overall survival have necessitated advances in both prediction and mitigation of normal tissue injury. For this study, regarding improving the therapeutic index in patients with lung cancer, carcinoembryonic antigen (CEA) has been selected as pertaining to tumor burden, and cardiac troponin has been selected as pertaining to normal tissue injury. The use of biomarkers that are easily obtainable, utilize standard processing, and do not require additional

resources can improve equity across healthcare systems.

### METHODS

This was a prospective study of patients with lung cancer, including non-small cell lung cancer (NSCLC), small cell lung cancer (SCLC), mesothelioma, and neuroendocrine cancer who received thoracic radiation either with or without chemotherapy. It included patients with lung cancer undergoing thoracic radiation for curative intent as well as those who received treatment along the oligoprogressive/oligometastatic paradigm. For the CEA aim, CEA levels were drawn pre-treatment. If elevated, post-treatment and surveillance levels were drawn, and patients were tracked for disease stability and/or progression. Radiation therapy plans were reviewed, and mean and maximum gross tumor volumes were recorded. For the troponin aim, Troponin levels were obtained through clinical laboratory draws pre-treatment, post-treatment, and during routine standard of care follow-up. Radiation therapy plans were reviewed, and the mean and maximum heart dose were recorded. Patients were followed for the development of MACE during routine standard of care follow-up.

### RESULTS

We demonstrated, in this study, that while CEA did not appear to have diagnostic value, it did

have prognostic value with regard to disease progression, progression-free survival, and overall survival. In addition, there was a relationship between CEA levels and both the mean and maximum gross tumor volume. We found that pre-treatment hs-TnT and hs-TnI were related to post-treatment cardiac events, but we did not show a correlation of maximum or mean heart dose and cardiac events or troponin levels. We demonstrated that hs-TnI and hs-TnT appear

related, and hs-TnI has the potential to be used as a surrogate for hs-TnT.

## CONCLUSION

Overall, the results of this study contribute to improvements in the therapeutic index of cancer therapy for both tumor control (CEA) and normal tissue injury (cardiac troponin) and can potentially improve equity and accessibility across healthcare systems.