Impact of Metastatic Bone Disease on the Progression of Cachexia in Lung Cancer

S. Tyler Jines[1], Anuradha Valiya Kambrath[1], Jon-Luc Poirier[1], Christopher D. Collier[1]
[1]Department of Orthopaedic Surgery, Indiana University School of Medicine, IN, USA

Background/Objective: Cachexia is a systemic wasting syndrome characterized by skeletal muscle mass loss and is estimated to affect 80% of lung cancer patients. Previous studies have shown that metastatic bone disease may have a role in inducing cachexia, which is mediated by cytokines such as IL-6, TNF-α, and TGF-β. To develop therapies for cachexia, a better understanding of the impact of metastatic bone disease and these cytokines on cachexia is needed.
Methods: Patients diagnosed with lung cancer were identified from an institutional database and were designated to one of three cohorts: local disease (n=63), osseous metastatic disease (n=39), and extraosseous metastatic disease (n=39). Body mass index (BMI) at diagnosis and follow up were collected. Change in BMI per year was calculated and the Kruskal-Wallis Test was used to compare groups. In a parallel study, ELISA was performed for IL-6, TNF-α, and TGF-β on supernatant collected after 48 hours from the cell lines BEAS-2B (normal lung epithelia), H1299 (lung cancer), and A549 (lung cancer). These groups were compared using a one-way ANOVA.
Results: Median change in BMI was not statistically different (*P*=.79) among any cohort. The cytokine level varied by cell line. H1299 had significantly increased levels of TGF-β as compared to BEAS-2B (*P*=.004). A549 had elevated, but not a statistically significant different level of IL-6 as compared to BEAS-2B (*P*=.17). TNF-α was not present in any cell line.
Conclusion: BMI was not associated with disease state with the numbers available. The parallel study showed cell line specific elevation of TGF-β and IL-6 in lung cancer compared to noncancerous tissues. Together, these findings are inconclusive but support continued investigation into the pathogenesis of cachexia in lung cancer. Future studies will employ imaging-based body composition measurements in these disease cohorts and explore interactions between tumor, bone, and muscle in vitro.