

AbstractID: 2303 Title: Functional Imaging for Clinical Radiotherapy

Functional imaging affords opportunities to better understand RT-induced normal tissue injury, better identify the target tissues, and hence improve the therapeutic ratio. For normal tissues, we have conducted prospective trials exploiting functional lung and heart imaging to better understand radiation-induced toxicities. These studies demonstrate a dose- and volume-dependent reduction in regional lung and heart perfusion. The extent/severity of regional perfusion change are related to changes in global organ function. This information is therefore useful in more optimally defining normal tissue complication probability models. Further, in situations where function is heterogeneous prior to RT, radiation treatment plans can be optimized to limit the "incidental dose" to relatively non-functioning regions of normal tissue. For tumors, PET and MRI imaging provide promise to better localize the target tissues and consider regional differences in tumor "function". For both normal tissues and tumors, we have explored the concept of functional equivalent uniform dose, and dose function histograms.

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