

AbstractID: 14514 Title: Late Effects from Modern Radiation Therapy

Long-term survival rates for patients with cancer are large and increasing. In survivors who received radiotherapy, the prevalence of radiogenic late effects is also large and increasing, with the potential to become a public health issue of considerable proportion. A multitude of late effects are associated with radiation exposure, include the development of second cancers, cardiac toxicity, cognitive deficits, and musculoskeletal growth abnormalities in children. In modern radiotherapy, much effort is devoted to developing personalized treatments that control the tumor while minimizing acute toxicities to surrounding healthy tissues; comparatively less attention is paid to minimizing late effects. However, in recent years, much progress has been made toward quantifying the radiation exposures and the associated risks of late effects from modern external beam radiation radiotherapies. The objectives of this lecture are to provide an introduction to radiotherapy-induced late effects, including the governing biologic and technical factors, to discuss techniques to minimize radiation exposures and risks, and to speculate on future developments that will enable personalized, risk-optimized radiation treatments.

Learning Objectives:

1. Understand sources of radiation exposure and risk of relevance to radiogenic related late effects following modern external beam radiotherapy.
2. Understand techniques to quantify radiation exposures and to predict the associated risks of late effects.
3. Understand techniques to minimize radiation exposures and risks using existing technologies.