

AbstractID: 14364 Title: Positron Emission Tomography Imaging for Radiation Treatment Planning

The goal of this presentation is to provide an overview of physical and biological issues relevant to the use of PET in Radiation Oncology.

The role of partial volume effect and patient motion on the reliability of quantitative analysis of PET data using SUV-based approaches will be considered. Biological issues, such as non-homogeneous uptake of PET tracers in both normal tissues and cancer lesions, possible absence of a well-defined lesion boundary, and their effect on the reliability of automated FDG PET image segmentation will be discussed. A review of the published data comparing results of automated PET image segmentation to the underlying histopathological data will be provided. Different FDG PET image segmentation techniques and their validation will be discussed.

Ambiguity caused by the lack of in vivo validation data for some of the novel tracers currently investigated will be addressed. Necessity of dynamic PET data acquisition and/or determination of optimal imaging time point will be discussed. Currently available data on automated segmentation of non-FDG PET images and its utilization in Radiation Oncology treatment planning will be discussed.

Learning Objectives:

1. To understand some of the causes of quantitative inaccuracy in PET imaging
2. To evaluate clinical applicability of PET image autosegmentation techniques
3. To understand the issues specific to non-FDG PET