AbstractID: 2321 Title: IMRT Optimization From A Clinician's Perspective

The optimization of radiotherapy treatment planning using automated techniques will provide a more reliable framework than current manual methods for deciding whether a plan is ideal. In perfecting such an approach, the clinician must communicate in objective terms the parameters of importance and the relative merit of each. The concept of optimizing a radiotherapy treatment plan implies a thorough understanding of primary tumor dose-response and the tolerance of the surrounding normal structures. However, well-defined tumor control (TCP) and normal tissue complication (NTCP) probabilities are not available in many sites. The optimization process involves trade-offs, not only balancing TCP with NTCP, but also the lack of adequately defined parameters must be considered. Assumptions are always made, attempting to err on the side of caution, which may obfuscate the optimization process. Nonetheless, the gains from optimization will be considerable.

The planning of radiotherapy for prostate cancer is a prime example. While some knowledge of prostate cancer dose-response has emerged over the last 5 years, there are still considerable differences between groups in treatment approach. The CTV and PTV volumes, dose prescription, minimum and maximum PTV dose limits, volume of rectum and bladder outlined, and inclusion and definition of the erectile tissues (penile bulb and cavernosal bodies) are some of the many factors that need to be considered. Moreover, the normal tissue dose-volume histogram (DVH) constraints are far from being consistent between centers. Using prostate cancer as a model, these considerations along with a proposed template for prioritization of constraints in the optimization process will be presented.

Educational Objectives:

1. Understand the requirements for developing a plan optimization process.
2. Understand the rationale and potential problems of existing TCP and NCTP data in constructing target and normal tissue constraints using prostate cancer as a model.
3. Identify key elements in the prioritization process for plan optimization using prostate cancer as a model.