AbstractID: 4395 Title: Extracranial Stereotactic RT

Advances in high precision radiation planning and delivery, image guidance technologies and methods to account for and reduce organ motion have made it possible for cranial stereotactic radiosurgery techniques to be applied to tumors outside of the brain. Stereotactic body radiation therapy (SBRT) refers to the use of a limited number of high dose fractions delivered very conformally to targets with high accuracy, using biologic doses of radiation far higher than those used in standard fractionation.

The rationale for SBRT is that there is a need for improved local therapies for many primary cancers and also in the situation when there are 'oligo' (i.e. isolated) metastases, specifically in sites where surgery has been shown previously to be able to cure patients with 'oligo' metastases, e.g. colorectal cancer, renal cell cancer and sarcoma. SBRT has the potential to be used in place of surgery in situations when surgery may associated with high risk.

Advancements outside of radiation oncology also provide rationale for SBRT. Functional imaging such as PET allows better patient selection for SBRT. Furthermore, improvements in systemic therapy more likely to control micro-metastases provide rationale for improving local therapies, such as SBRT, to reduce large foci of tumor burden.

There are radiobiological advantages to SBRT including less opportunity for tumor repopulation and repair. Furthermore, the shorter SBRT treatment times are more convenient for patients and have resource utilization advantages.

With highly potent doses of SBRT delivered with steep dose gradients, the potential for geometric uncertainties in the setting of SBRT to lead to adverse clinical outcomes (tumor recurrence and/or toxicity) is high. Thus, the need for image guided radiation therapy (IGRT) to improve precision of dose delivered is heightened. IGRT decreases the heterogeneity in delivered doses, improving our ability to measure the impact of dosimetric and non-dosimetric factors on SBRT clinical outcomes.

This lecture will provide an overview of the rapidly increasing clinical experience with SBRT and IGRT in the setting of SBRT. Case examples demonstrating clinical benefits and potential toxicities will be discussed.

Educational objectives:

1. To understand the clinical rationale for SBRT
2. To describe the rationale for IGRT in SBRT
3. To understand the increased risks of SBRT compared to conventional RT and the increased potential for error