AbstractID: 4435 Title: Role of IMRT in the Treatment of Gynecologic Malignancies

Intensity modulated radiation therapy (IMRT) is increasingly used for the treatment of gynecologic malignancies. A survey conducted in 2004 found that over 35% of the radiation oncology clinics with IMRT were using this modality in gynecologic patients. While treatment planning is an important aspect of gynecologic IMRT, successful implementation requires careful attention to detail throughout the entire planning process. At the University of Chicago, IMRT planning for whole-pelvic gynecologic patients begins with a CT simulation. Patients are treated in the supine position, and customized immobilization devices (alpha cradles) are fabricated which are subsequently indexed to the treatment table. Oral, intravenous and rectal contrast are used to aid in the delineation of the CTV and surrounding normal tissues. The CTV consists of the contrast enhanced vessels (plus a 2 cm margin) to identify common, external and internal nodal regions along with the upper half of the vagina, parametrial tissues, presacral region and uterus (if present). A PTV is added to the CTV based on measured set-up uncertainties and organ motion data. Normal tissues that are contoured include the bladder, rectum, small bowel and pelvic bone marrow. For treatment planning, 7 (small patients) or 9 (larger patients) equally spaced, co-planar beams are used. Input parameters derived for treatment planning were developed over time, and their evolution will be discussed. Values used for a number of commercially available planning systems will also be presented. Treatment plans are evaluated primarily based on the PTV coverage and normal tissue DVHs. For the PTV, acceptable plans are defined as those which cover >98% of the volume with the prescription dose while <2% of the PTV receives >110% of the prescription dose. Evaluation of small bowel is based on a normal tissue complication probability (NTCP) curve for the incidence of acute gastrointestinal toxicity of IMRT patients treated in our clinic. From this analysis, acceptable plans are those in which <200 cc of the small bowel region receives 45 Gy (prescription dose). We have also recently defined bone marrow constraints for patients receiving concomitant chemotherapy, and these will be discussed. Image-guided radiotherapy (IGRT) has received increasing attention as a component of treatment delivery. In gynecologic IMRT, there are three areas where IGRT may offer substantial benefit. First, IGRT may reduce geometric misses by providing daily information on isocenter displacements and patient rotations. Additionally, IGRT has an important role in cervical cancer patients where the tumor is shrinking during the course of treatment. Using IGRT, tumor size and position can be monitored and the treatment plan can be modified appropriately. Lastly, IGRT approaches are currently being considered in the development of IMRT approaches to replace intracavitary brachytherapy. Clinical examples of each of these approaches will be presented.

Educational Objectives:

1. To understand the practical aspects of IMRT planning for gynecologic malignancies
2. To describe the criteria for IMRT plan evaluation in gynecologic patients
3. To consider the role of image-guided technologies in this disease site