

### IMRT in Gynecological Malignancies

Intensity modulated radiation therapy (IMRT) is increasingly used for the treatment of gynecological tumors. Successful implementation requires careful attention to every detail from patient selection to simulation, to planning, to setup, to localization, and to delivery. At the University of Chicago, all patients are simulated and treated in supine position using customized alpha cradles indexed to the treatment table. Oral, IV and rectal contrast are used to help in the delineation of the CTV and surrounding normal tissues. The CTV consists of the upper half of the vagina, uterus (if present), parametrial tissues, parasacral region, and the contrast enhanced vessels plus a 2cm margin to identify the common, external and internal nodal regions. PTV is constructed by adding a margin based on the setup uncertainty and organ motion data. Normal tissues contoured include bladder, rectum, small bowel and pelvic bone marrow. For treatment planning, 9 equally spaced co-planar beams are used. Input parameters derived for the PTV and surrounding normal tissues were developed over the time, and their evolution will be discussed. Treatment plans are evaluated primarily based on the PTV coverage and normal tissue DVHs. 3-D dose distribution plays an important role in the IMRT delivery and is rigorously evaluated by both physicists and physicians at our institutions. Acceptable plans are the ones that have a minimum coverage of 98% of the PTV volume with the prescription dose while no more than 2% of the PTV receives more than 110% of the prescription dose. Evaluation of small bowel dose is based on a NTCP analysis for the incidence of acute gastrointestinal toxicity of IMRT patients treated in our center. From this analysis, small bowel volume receiving prescription dose (45Gy) should be less than 200cc. Plan acceptance criteria for rectum and bladder will also be discussed during this course. Recent studies conducted in our center studies have associated the volume of pelvic and lumbosacral bone marrow (PBM and LSBM) receiving 10 and 20 Gy with acute hematologic toxicity (AHT) in patients receiving concurrent chemotherapy and IMRT. We will discuss and present plan consideration for bone marrow sparing IMRT to reduce AHT in these patients. QA is one of the most important and integral part of any radiation therapy procedure. IMRT QA, in our institution, is performed using independent monitor unit verification (MUV) and patient specific measurements and will be discussed in details. In addition, recent studies reporting adaptive treatment and image guided approaches in the treatment of gynecological tumors will be briefly reviewed.

#### Educational objectives:

- 1- To understand the practical and fundamental aspects of IMRT planning for gynecological malignancies
- 2- To discuss the GYN-IMRT plan evaluation and acceptance criteria
- 3- To review and discuss the IMRT quality assurance issues for this disease site.
- 4- To briefly review and critique adaptive and image guided GYN-IMRT approaches.