

## **IMRTintheTreatmentofGynecologicalMalignancies**

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IMRT presented a major advancement in the radiotherapeutic management of gynecologic cancer. It has been shown that IMRT has reduced the incidence and severity of radiation-related toxicity in this disease site. However, the precise dose distribution produced by IMRT is less forgiving and great care is required in order to achieve the intended results. An adequate understanding of the entire process - from proper patient selection to positioning/immobilization to treatment planning and delivery - is essential. The primary goal of this presentation is to provide a practical overview of IMRT for gynecological malignancies. A discussion of the steps in the GYN IMRT process will include patient selection, immobilization, simulation, structure delineation, planning strategies and parameters, PTV and critical organ dose objectives, plan evaluation, QA, and potential delivery issues. Guidelines and practical examples of the GYN IMRT process will be presented.

At our institution, gynecologic patients are treated in the supine position with customized immobilization devices (alpha cradles), which are 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 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. Several recent studies have addressed these issues and will be reviewed here. For treatment planning, 9 equally spaced coplanar beams are generally used. Input parameters derived for treatment planning were developed over time, and their evolution will be discussed. Treatment plans are evaluated primarily based on the PTV coverage and normal tissue DVHs. Evaluation of small bowel is based on a normal tissue complication probability (NTCP) curve for the incidence of a cutaneous gastrointestinal toxicity of IMRT patients treated in our clinic. From this analysis, a acceptable plan is one in which <20% of the small bowel region receives 4.5 Gy (prescription dose). We have also recently defined bone marrow constraints for patients receiving concomitant chemotherapy, and these will be discussed.

Finally, current research and future directions for GYN IMRT will be introduced. For instance, image-guided radiotherapy (IGRT) has received increasing attention as a component of IMRT planning and delivery. We will discuss the potential role of novel image-guidance techniques in GYN IMRT. In addition, we will present IGRT/IMRT techniques that are currently being considered to provide an alternative or supplement to brachytherapy. Clinical examples of each of these approaches will be presented.

### **Educational Objectives:**

- 1-To provide an educational review of the practical aspects of IMRT planning for gynecologic malignancies
2. To understand and review the criteria for IMRT plan evaluation in gynecologic patients
- 3.To review the planning methods used to achieve plan acceptance criteria
- 4.To discuss the role of IGRT technologies in this disease site.