

HDR Brachytherapy commissioning and quality assurance for HDR remote afterloader, source exchange, applicators

Brachytherapy is the first conformal radiation therapy. A sealed source is placed in or in contact with the tumor providing dose to the tumor with small volumes of normal tissue irradiated. It became more sophisticated with the usage of remote afterloader. With this, our responsibility as physicists increased and became critical in ensuring an accurate and precise treatment planning and delivery. The ability to deliver a correct treatment is conditioned by the precision of the source placement at the dwell point/points predicted by the treatment planning system (TPS). The introducing of the CT based planning gave the possibility of reconstructing not only the correct shape of a treated volume but the correct reconstruction of the applicators, the catheters, and localizing the first dwell position (the stopping point) of the radioactive source that will deliver the treatment.

The first condition of delivering a good and accurate treatment is correct catheter and applicators reconstruction, correct distance evaluation to each dwell position, and extremely good and well organized quality control program before the applicators and connectors are used and before the treatment plan is sent to the treatment console.

This lecture will provide an introduction into the understanding of High Dose Radiation Therapy QA and commissioning of the applicators. It will provide detailed descriptions of the remote afterloader, applicators, and all the quality assurance tools necessary for organizing and running a safe and secure High dose radiation therapy program (HDR) in a cancer center.

Learning Objective:

- Understanding the HDR process: technical and practical
- Understanding the importance of a well implemented quality assurance program
- Understanding the different aspects of commissioning and calibrating of the radioactive source and the applicators used in HDR.
- Challenges and solutions of running a HDR program in a cancer center