Contribution ID: **75** Type: **Proffered Papers**

Implementing compensator IMRT using Low Cost Effective Solution - A Zambian Experience

Tuesday 16 February 2021 11:51 (7 minutes)

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Purpose IMRT is now the standard radiotherapy delivery mode. It was not available at the Cancer Diseases Hospital (CDH) of Zambia and many RT clinics in Low- and Middle-Income Countries. CDH has one Primus LINAC and two cobalt machines, all without MLC. There are two planning systems Oncentra External Beam and Brachytherapy and the Prowess planning system. CDH currently can deliver 3D EBRT and BT very well and has a mould room which is equipped to fabricate blocks and compensators and other immobilization devices. We report here our initial experience of implementing a recyclable compensator-IMRT solution. The solution is based on an in-house compensator-IMRT solution of the University of North Carolina that treated 1500 patients. We evaluated the feasibility of the IMRT solution from US in a LMIC clinic for clinical implementation.

Methods The Government of the Republic of Zambia (MoH/CDH) and EmpowerRT signed a memorandum of understanding to bring the EmpowerRT solution to Zambia. The solution includes software (treatment planning software PLUNC and an eChart designed for manual operation clinics), hardware (milling machine and compensator fabrication materials), service (commissioning and local network setup), and training (software, QA, and procedures). The training consisted of weekly remote training and one onsite training to CDH physicists, radiation oncologists, and RTTs.

Results EmpowerRT provided the 3D and IMRT commissioning of Primus Linac. The training included CDH staff teaching each other, a crucial step for us to make the solution our own. We found two PLUNC features particularly useful. Plan Comparison allows us to compare plans (i.e., a 3D and an IMRT) and make a clinical decision on which plan to use. Plan Motion-Effect shows the patient setup uncertainty on cumulative Dosimetry of a fraction treatment course. It allows us to use IMRT safely and sensibly as we do not have online imaging. We use standard immobilization devices. Estimated patient setup uncertainty is used to compute the cumulative dosimetry of an IMRT plan to determine if the IMRT plan safe to use. Our RTTs found EmpowerRT's color-coding system (each block and compensator pair labeled with a unique color dot) easy to use and the compensator fabrication and QA procedures are easy to follow to constantly produce high quality compensators. We have done initial testing of eChart, a new product of EmpowerRT for clinics that still use paper charts. In PLUNC users can export to the eChart treatment prescription, machine parameters of each field, DRRs of setup and treatment fields, isodose distribution, DVHs, plan goal sheet, and other information. The eChart is not linked to our analog treatment machines that we operate manually but it highlights the field and its machine parameters to be treated next, records the actual MU/time delivered provided by RTT, computes the delivered total dose so far, and highlights any deviations. Both the eChart and PLUNC run on a server and available to all connected CDH computers.

Conclusion It is feasible to implement EmpowerRT's compensator-IMRT solution in Zambia using existing resources. The approach of training a trainer ensures local knowledge retention.

Country or Int. Organization

Zambia

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Session Classification: Paper Session 2: Implementation of New Technologies