

Adaptation of an Extended Five Field technique for the treatment of Head & Neck Cancer at Cancer Diseases Hospital

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Background: The definitive treatment of Head & Neck Squamous Cell Carcinoma (HNSCC) requires the delivery of high doses (66 –70 Gy) to the planning target volume (PTV) which includes the gross tumor with associated microscopic disease, nodal levels I –VI depending on tumor site and a margin. In the absence of Intensity Modulated Radiotherapy (IMRT), this is safely delivered using a combination of two lateral opposed Head and Neck fields (photon) matched to an anterior neck field (photon) and electron beams for the treatment of the posterior neck area. The Cancer Diseases Hospital (CDH) is the only center offering radiotherapy in Zambia though in the recent past there has been frequent breakdowns and extended downtime on the only Linear Accelerator (LINAC) due to the wear and tear of the aging machine, and sometimes electrons are unavailable. With the existing challenges, the Head and Neck Unit at CDH searched for alternative treatment techniques for the treatment of HNSCC without the use of electrons. Fogliata et. al. (1999) described a 5-photon field technique covering the whole neck that avoided field matching and electron beams. This paper provided the basis of the feasibility and adaption of the 5-photon field plan without electrons on Cobalt-60 machine.

Methods and Materials: Using the 5-field plan as described by Fogliata et. al. (1999), a HNSCC was selected and planned for radiotherapy on a cobalt-60 machine. The plan is mono-isocentric and the prescription to the PTV54 was 54 Gy. The PTV54 included Nasopharynx (NP), High Risk Lymph Nodes (HRLN) and Low Risk Lymph Nodes (LRLN). An additional 12 Gy boost was prescribed to a reduced Boost PTV66 which included NP and HLN to a total of 66 Gy. The plan was analysed using CBCHOP method (Dean, et. al., 2017). Presented here are the results for the case for a patient with nasopharyngeal cancer.

Results: Using the 5-field plan the 95% PTV54 received 80.9% (43.7 Gy) of the prescribed dose. The maximum, minimum, median and mean doses were 115.1%, 66.6%, 98.2% and 96.9% respectively of the prescribed dose. The dose constraint to the spine was set at 79.6% (43 Gy) and what was achieved was a maximum dose to the spinal cord of 80.0% (43.2Gy).

Conclusions: We therefore find it acceptable to treat patients with this technique in the absence of electrons. It is possible to plan patients for conformal HNSCC treatment on the cobalt machine. Further validation will be done through analysis of more plans for treatment on the cobalt machine.

Country or Int. Organization

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