

Adaptation of an Extended Five-Field Technique for the Treatment of Head & Neck Cancer at the Cancer Diseases Hospital



BC M'ULE, M MWALE, CK MWABA, G PUPWE, SC MSADABWE, MM KANDUZA, AN MWALE, M MOFYA, M KAWESHA, H MUNKUPA, E CHANDA, P NANKONDE, M CHIPAMPE, S JERE, A SINALUME, C CHINTALA, L BANDA, DC LOMBE, K LISHIMPI

Cancer Diseases Hospital, Nationalist Road, Lusaka Zambia

* Corresponding author: chandamule@gmail.com; kcmlishimpe@yahoo.co.uk

Background and Objective

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. 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. The Bellinzona technique [1], [3] provided the basis of the feasibility adaption of the 5-photon field plan without electrons on the Cobalt-60 machine.

Methods

A Patient with nasopharyngeal SCC was simulated using a CT simulator, the patient was immobilized a head mask. The CTV and OAR were contoured by the radiation oncologist. The Bellinzona technique [1] describes a five-field mono-isocentric plan consisting of two lateral, two posterior oblique and a posterior field of the head and neck and this was used to generate a treatment plan for a cobalt machine. PTV54 included the 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 [2].

Results and Discussion

Using the 5-field plan the 95% PTV54 received 80.87% (43.7 Gy) of the prescribed dose instead of the set 95%. The maximum, minimum, median and mean doses were 115%, 66.6%, 98.2% and 96.9% respectively of the prescribed dose. The dose constraint to the spine was set at 79% (43Gy) and what was achieved was a maximum dose to the spinal cord of 80% (43.2Gy). The plan with the LINAC will be compared to the Cobalt 60 plan and we expect that a much less dose to the spinal cord with a much better dose distribution in the tumour will be achieved.

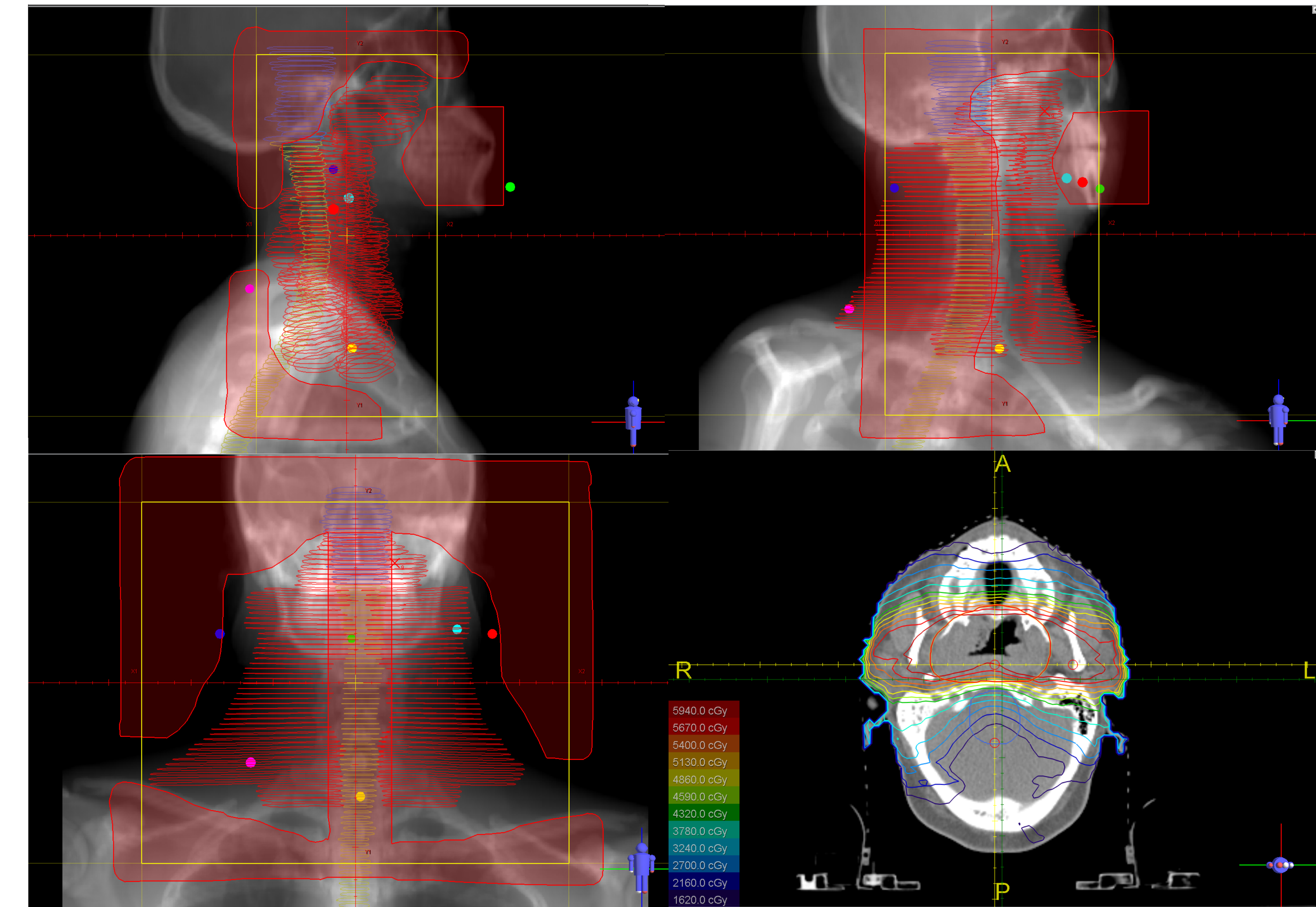


Figure 1: BEV of the LAT, RPO and the Post neck Field

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.

References

- [1] FOGLIATA, A., COZZI, L., BIERI S AND BERNIER J, Critical appraisal of a conformal head and neck cancer irradiation avoiding electron beams and field matching, Int J. Rad. Onc. Bio Phys 45(5) (1999) 1331-1338
- [2] [HERRASSI, M. Y., BENTAYEB, F., AND MALISAN, M. R., Comparative study of four advanced radiation therapy techniques for head and neck cancer, (2013) 98-105