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abstract

# Hippocampus Sparing for Patients Undergoing Intensity-Modulated Radiotherapy for Nasopharyngeal Carcinoma in Morocco: A Dosimetric Study

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# Hippocampus Sparing for Patients Undergoing Intensity-Modulated Radiotherapy for Nasopharyngeal Carcinoma in Morocco: A Dosimetric Study

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**Introduction:** Our study aims to evaluate the dose received by the hippocampus for patients with undifferentiated carcinoma of the nasopharynx (UCNT) treated with volume-modulated arc therapy (VMAT).

**Methodology:** This retrospective study analyzed the dosimetric data of 20 patients with undifferentiated nasopharyngeal carcinomas treated with arc therapy (VMAT) for a total dose of 70 Gy delivered in 2 Gy daily fractions. Each case was compared with 2 dosimetric plans, a standard arcTherapy plan and an arc therapy plan with hypocampus sparing (HS-arc therapy). Hippocampus delineation was based on the RTOG contouring guidelines. Both hippocampi were delineated on axial imaging CT-scan, and MRI imaging fusion. The evaluation parameters include DMin, Dmean, and D40% doses received by the hippocampus, and the coverage of the target volume (PTV) evaluated by the V95% and the homogeneity index in both groups.

**Results:** The mean hippocampus volume was 6.24 cm3 (±2.61 cm3), we had a reduction in the radiation doses received by the hippocampus, in particular the D40%, from 12.15 gy ( ± 2.1 Gy) in the ArcTherapy standard planes to 6.92 ( ± 1.5 Gy) in the arcTherapy-HS planes (p-value< 0.001), a decrease in the Dmoy from 10.73 ( / 1.8 Gy) to 7.40 Gy ( / 1.3 Gy) (p-value < 0.01), and Dmin 5.87Gy (±1.1 Gy) Vs 3.93 Gy (±0.9 Gy) (p-value 0.05). The coverage of the target volume (PTV) was similar in both treatment plans.

**Conclusion:** Our dosimetric analysis suggests that, for patients undergoing VMAT radiotherapy for UCNT, hippocampus sparing significantly reduces the doses received by the hippocampus while ensuring good coverage of target volumes. However, the impact of hippocampus sparing on patients' quality of life requires more clinical studies focused on the cognitive functions of patients with UCNT.

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