

INTRODUCTION OF LARGE SURFACE MASK (LSM) AND 3D CONFORMAL RADIATION TECHNIQUE (CRT) IN THE TREATMENT OF THE NEUROAXIS (NA)

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Purpose/Objectif: The irradiation of the neuroaxis requires special technique in order to achieve precise patient (pts) immobilisation, correct field matching, homogenous dose distribution and protection of the surrounding tissues. Our goal was to perform a phase I clinical testing of the NA irradiation with introduction of individual vacuum cushion- thermoplastic mask combination and LSM immobilisation for 3D CRT.

Materials/Methods: We analysed the dose distribution and treatment delivery of 5 pts (1 child, 4 adults) with individual immobilisation (vacuum mattress, LSM /AIO Solution™ ORFIT/) 2 pts in prone and 3 in supine position. Pts were treated with 3D CRT (XIO(CMS) planning system). The 2 opposed, lateral, MLC-collimated, rotated 6MV photon fields were used for the brain. The spinal cord of the adults was treated with 2 (the child's with 1) wedged, direct 6MV photon fields. All field matchings were moved weekly. The total NA dose was 25.2-36 Gy, the boost dose was 17.6-33.4 Gy with 1,8-1,6 Gy/fr. The tumours histology were ependymoma, dysgerminoma and 3 medulloblastomas.

Results: For the whole group 95-97% of the PTV was within the 95% isodose. 4-10% of the PTV received less than 95% of the prescribed dose, and 3-10% of the PTV received higher than 105% of the reference dose. In 4 cases we could achieve the PTV dose-homogeneity according to the ICRU recommendation (95-105%).

The doses of the organs at risk:	D _{Mean} (Gy)	% of D _{Mean}
Left lens	1.44-4.97	5.1-14.8
Right lense	1.37-4.84	4.9-14.5
Left lung	0.8-2.49	3.0-6.9
Right lung	1.92-3.54	7.1-10.0
Heart	6.59-16.3	24.4-46.4
Left kidney	0.51-1.77	1.9-5.0
Right kidney	0.36-1.93	1.4-5.5
Bowels, stomach	5.04-7.71	14.0-21.4
Liver	2.72-6.54	10.8-18.6

We did not detect significant difference of the doses homogeneity and the toxicity of the protected organs between the prone and the supine position.

Conclusions: The supine position proved to be superior because of pts comfort, intra-, and interfraction position stability and reproducibility. Therefore we prefer the supine position, but using a LSM is always necessary. Our data suggest that this immobilisation and planning technique could be used in a larger scale in the practise of the NA irradiation.