

Lattice Radiotherapy (LRT) Protocol: Valencia Protocol

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Abstract

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Abstract

Objective: To report about this protocol of Radiation therapy modality for the treatment of bulky tumors and poor prognostic patients in our hospital. We begin to apply it in December 2019.

Methods: Main inclusion criteria are a tumor volume greater than 45 cc.

Secondly, one of secondary criteria is required:

- Unresectable tumor
- Inoperable patient
- Failure after systemic management or poor candidate for systemic therapy.
- Radioresistant tumor
- Tumor site: lung, sarcoma, melanoma, liver, renal cancer and metastasis.

CT Simulation and planning

- Slices 2 mm or less
 - Immobilization as SBRT
 - PET-CT and/or MRI for fusion with planning CT images.
- Irradiation technique
- IMRT or VMAT irradiation technique with CBCT

The Target volumes will be as follows:

GTV, CTV, PTV and RVR (Remaining Volume at Risk)

The Lattice specific volumes to be considered are:

- LTV (Lattice Tumor Volume)
- VTV (Vertice Tumor Volume)
- VV (Valley Volume)

LTV is defined inside the GTV where the Radiation Oncologist can exclude certain structures as his own criteria, as large vessels or other anatomical organs.

Administration of LRT as single fraction with maximal dose between 15 and 18 Gy in the VTV, included in a treatment with standard fractionation of 2-3.5 Gy/fraction in PTV as planned per Radiation Oncologist discretion.

The VTV contour is set of 1 cm spheres placed inside the LTV. There must be a minimum of 4 vertices, usually separated 2,5-3 cm between centers of the sphere.

The VV (Valley Volume): LTV- VTV. (LTV minus VTV)

VTV12Gy is defined as the volume over 12 Gy.

Valley dose (minimum dose between the vertices) should not be greater than 5 Gy.

Marginal PTV dose must be less than 120% prescription dose in the LRT fraction.

Dosimetric parameters necessary to be documented:

- V2% of VTV \geq 15 Gy.
- V50% of the VTV \geq 12 Gy.
- V50% of PTV < 5Gy
- V5Gy < 50% of the PTV
- V30% of VV < 8Gy
- V8Gy < 30% of the VV
- Ratio VTV12Gy/GTV < 3% of the GTV.
- The dose outside the PTV (RVR) must be less than 120% of the PTV prescription dose in all fractions.

Results: Dosimetrics results for the first 21 patients (11 lung, 2 cervix, 2 head and neck, 1 axillary sarcoma, 1

timoma, 1 uterine, 1 hepatobiliary, 2 pelvic metastasis) are excellent. Tumor reduction bigger than 50% has been observed in most cases in the two weeks after LTR session. No additional toxicity has been related.

Conclusion: This protocol is feasible to apply to bad prognostic and big volume tumors. Our early experience is with very good response and no added toxicity.