

Selected Radiation Treatment Applications

Radiation Treatment	Purpose	Overview	Ref
Brachytherapy	Commissioning LDR tandem/ovoid applicator	Channelled PRESAGE - Pd-103, Cs- 131 & I-125	1, 2
	Measure LDR dose	Deformable PRESAGE H ₂ O equivalent attenuation properties-Cs-131 / I-125	3
	Liquid Y-90 for 5.75 days	1.09 mm channel	4
	Characterize Xofigo Axxent	Obtain independent confirmation of TG-43U1 dosimetry values	5
	Amersham 6711 and AgX100	±5%TG-43U1- dosimetry parameters measured in range of r =1 to r = 3 cm	6
	<i>In Vivo</i> - 4mm x 20 mm	2.5% agreement to Eclipse calc dose & 4% compared EBT2 film	7
	IGRT	XRad225 Micro-irradiator accuracy - 4 dosimeters	image to isotropic 0.5mm resolution
IMRT Verification	Head phantom-BOS IMRT-6 cases	Clinical significance deviations assessed through DVH curves & dose overlays patient's anatomy	9
	Identify optimal readout timing vs formulation	3D gamma for 3%/3 mm criteria - absolute measured dose 99.6%	10
Microbeam Radiation Therapy	160 kV - 32 Gy, 3 beams	FWHM across 3 beams constant (405±13 µm) between depths of 3.00-14.00 mm	11, 12, 13
Proton Therapy	Unmodulated depth dose comparison, within 3% in the beam entrance region	within 3% in the beam entrance region . SOBP - under response	14
Respiratory Gating	CIRS dynamic thorax phantom modified - 3 treatments	Gamma - PRESAGE and EBT were >99% (criteria 3% dose difference and 1.2 mm distance to agreement)	15, 16
Stereotactic radiosurgery	Gamma Knife Perfexion	Measurements within 1.5%, 0.12% & 0.70% of mfg Monte Carlo results	17
	Evaluate Cyberknife dose fractionation sensitivity	No dependence detected for any of the three independent PRESAGE batches in eight or sixteen fraction irradiation schemes.	18
	Novalis TX evaluate radiosurgery treatment of trigeminal-neuralgia	Good agreement was observed between the planned and 6-arc treatment plan	19
VMAT	RapidArc- one central target & 4 peripheral -15-25 Gy	3D gamma 99.9% @ 5% / 3mm & 98.0% at 3% / 2mm	20
	Identify optimal readout timing vs formulation	3D gamma for 3%/3 mm criteria - absolute measured dose 94.5%	10
	Comparison to Delta ⁴ QA phantom	Accuracy of Delta ⁴ varies based on treatment location	21

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