

Table 1. PTV volume and organ at risk dose constraints

Organ	Maximum point dose (Gy) in 30 fractions	Constraint
$PTV_{brainstem}$	54	
PTV_{optics}	$V_{54} < 1\%$	51 Gy (min)
PTV	66	$V_{100} \geq 95\%$
Retina	40	
Lens	10	
Optics_Optic	54	$V_{50} \leq 50\%$
Brainstem	54	
Optic Chiasm	54	

Table 2. Mean and maximum doses values over all 27 patients

	IMRT ₅	IMRT ₇	IMRT _{7-non}	VMAT _{2f}	VMAT _{2h}	VMAT _{2h-non}
CI	0.972	0.968	0.974	0.946	0.913	0.911
HI	1.124	1.125	1.125	1.126	1.134	1.144
PTV_{mean} (Gy)	60.16	60.31	60.30	60.22	60.18	60.36
PTV_{max} (Gy)	64.05	61.74	64.15	64.19	64.95	65.30
$Brainstem_{mean}$ (Gy)	23.79	23.61	24.77	23.43	24.64	24.23
$Brainstem_{max}$ (Gy)	55.54	55.69	56.32	55.39	56.58	55.77
Ipsi Cochlea _{mean} (Gy)	33.31	33.52	37.42	25.53	24.41	29.16
Ipsi Cochlea _{max} (Gy)	43.64	43.65	46.00	42.25	41.41	44.77
Optic Chiasm _{mean} (Gy)	36.07	33.71	32.16	37.41	36.36	33.50
Optic Chiasm _{max} (Gy)	50.78	49.65	49.09	51.69	51.85	50.71

	IMRT ₅	IMRT ₇	IMRT _{7-non}	VMAT _{2f}	VMAT _{2h}	VMAT _{2h-non}
Ipsi Lens _{mean} (Gy)	8,99	8,73	8,53	11,41	9,62	9,23
Ipsi Lens _{max} (Gy)	13.55	13.99	13.36	15.56	14.81	13.37
Contra Lens _{mean} (Gy)	6,80	4,17	4,28	10,71	5,19	4,08
Contra Lens _{max} (Gy)	9,56	6,89	6,77	14.17	8,23	6,39
Ipsi Eye _{mean} (Gy)	15.88	17.17	17.13	17.61	15.35	14.88
Ipsi Eye _{max} (Gy)	35.65	38.67	37.41	33.00	33.69	31.51
Contra Eye _{mean} (Gy)	9,82	6,74	6,60	13.69	8,09	6,48
Contra Eye _{max} (Gy)	19.86	15.46	14.44	23.50	17.55	13.91
Ipsi Opticnerves _{mean} (Gy)	31,08	30.13	31.14	33.64	27.81	30.97
Ipsi Opticnerves _{max} (Gy)	44.91	44.11	43.29	46.77	43.99	44.51
Contra Opticnerves _{mean} (Gy)	17.47	12,32	11,93	20.78	14.64	12,82
Contra Opticnerves _{max} (Gy)	27.68	23.21	21.47	30.77	25.90	22.72

Abbreviations: PTV: Planning Target Volume, max: maximum, IMRT₅: 5 beams coplanar Intensity Modulated Radiotherapy, IMRT₇: 7 beams coplanar Intensity Modulated Radiotherapy, IMRT_{7-non}: 7 beams non-coplanar Intensity Modulated Radiotherapy, VMAT_{2f}: 2 coplanar full arcs Volumetric Modulated Arc Therapy, VMAT_{2h}: 2 coplanar half partial arcs Volumetric Modulated Arc Therapy, VMAT_{2h-non}: 2 non-coplanar half partial arcs Volumetric Modulated Arc Therapy, Ipsi: Ipsilateral, Contra: Contralateral.

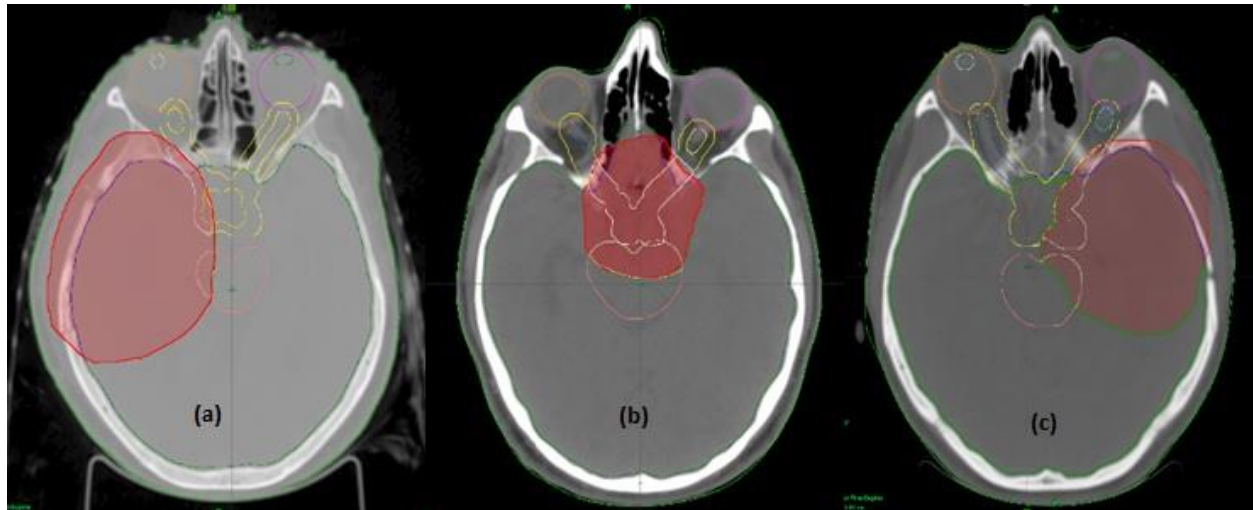


Fig. 1. Diagram of the treatment planning volumes and critical organs. $PTV_{brainstem}$:PTV-Brainstem, PTV_{optics} :PTV-Opticpathwaysplus, Opticpathway:optic chiasm+nerves, Opticpathwayplus:Opticpathway+3mm, Optics_Optic: Opticpathwaysplus- PTV_{optics} .

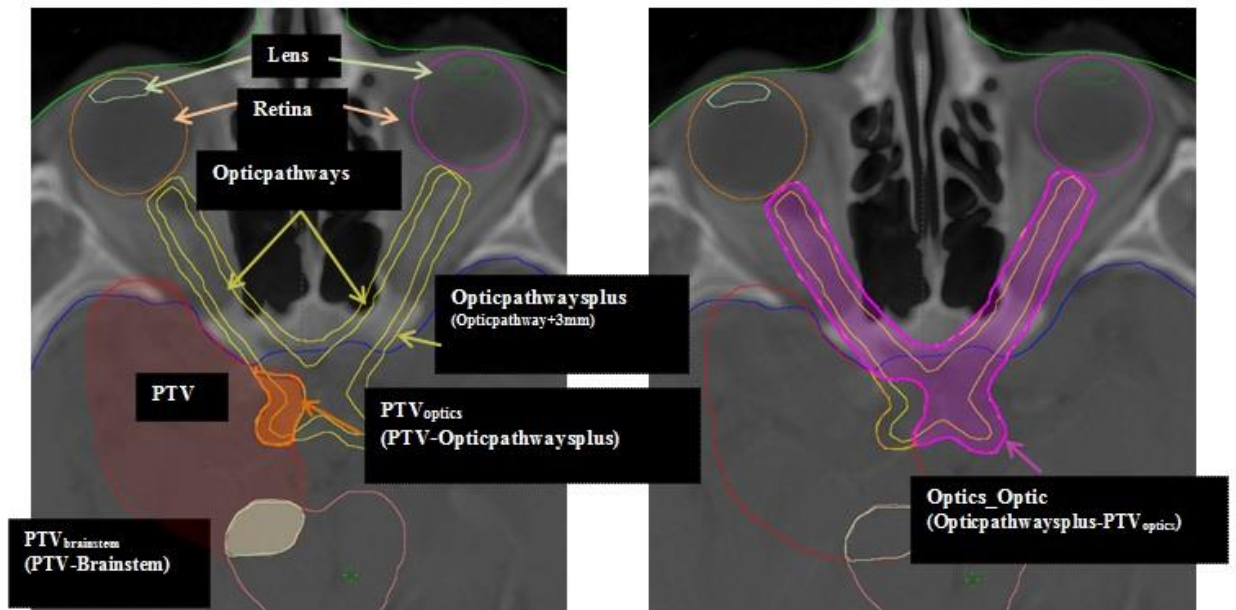


Fig. 2. Single axial slices dose distributions for IMRT (IMRT₅, IMRT₇, and IMRT_{7-non}) and VMAT (VMAT_{2f}, VMAT_{2h}, and VMAT_{2h-non}) plans.

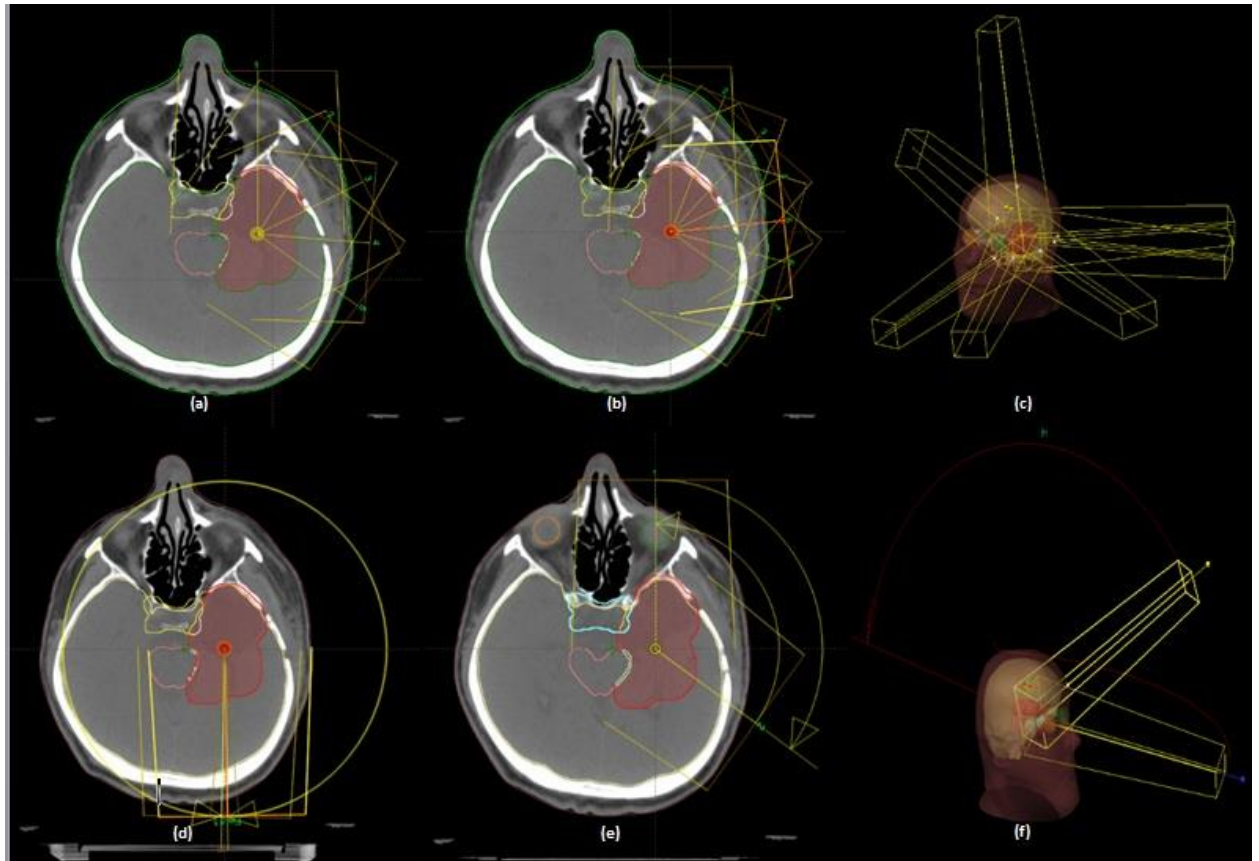


Fig. 3. Representative dose distribution (axial and sagittal views) of the 6 plans (IMRT₅, IMRT₇, IMRT_{7-non}, VMAT_{2f}, VMAT_{2h}, and VMAT_{2h-non}) of 1 high-grade glioma case.