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Table S1. National selection criteria for proton treatment in patients with brain tumors.

Organ at risk	Dose	Criterion	Clinically relevant reduction which can lead to referral for proton therapy	Notes
Brainstem ¹	D _{0.03cc}	< 54 Gy		Brainstem exclusive brainstem surface
Chiasm and Optic nerves ¹	D _{0.03cc}	≤ 54 Gy		
Cochlea ²	D _{mean}	≤ 45 Gy	> 10% reduction for D _{mean} > 45 Gy	Special care is to be taken for patients with impaired hearing
Retina ²	D _{0.03cc}	≤ 45 Gy	> 10% reduction for D _{0.03cc} > 45 Gy	Special care is to be taken for patients with impaired vision
Pituitary ²	D _{mean}	≤ 20 Gy	> 20% reduction for D _{mean} > 20 Gy	Age < 20 years
	D _{mean}	≤ 30 Gy	> 20% reduction for D _{mean} > 30 Gy	Age 20-70 years
	D _{mean}	None	None	Age > 70 years
Hippocampi ²	D _{40%}	≤ 11 Gy (EQD2 ≤ 7.4 Gy)	> 20% reduction for D _{40%} >11 Gy (EQD2 7.4 Gy)	
Brain-CTV-brainstem ²	V _{30Gy}		> 20% reduction	Age > 45 years
	D _{mean}		> 20% reduction	Age < 45 years

The number after the organ at risk marks the priority. First priority constraints are absolute constraints which are prioritized above target coverage.

Table S2. Patient characteristics of training (n=37) and test (n=12) cohort.

	Training cohort	Test cohort	P-value
Female, n (%) Male, n (%)	17 (46) 20 (54)	7 (58) 5 (42)	0.52
Median (range) age, years	47 (25-73)	37.5 (23-70)	0.41
Photon therapy, n (%) Proton therapy, n (%)	7 (19) 30 (81)	2 (17) 10 (83)	1
Median (range) dose to healthy brain for protons, Gy	8.64 (3.40-18.70)	8.13 (4.13 – 13.31)	0.29
Median (range) dose to healthy brain for photons, Gy	16.88 (7.20 – 28.30)	14.75 (10.81-22.90)	0.85
Median (range) CTV, cm ³	146.9 (4.4 – 362.9)	167.2 (60.4-331.5)	0.71

Fisher's exact test was used to assess the differences in categorical parameters, and the Mann-Whitney U test was used for the analysis of the dosimetric data. P-values under 0.05 were considered statistically significant.