Supplemental Table 1. Baseline clinical characteristics of the glioma cohort.

Patient	Survival	Sex	Age	Diagnosis	Tumor location*	Tumor Size†	Growth pattern‡	METH	IDHI	Resection
1	>3y	F	35	LGG	I	37	H	/	/	Partial
2	>3y	F	38	LGG	P	35	H	/	+	Full
3	>3y	F	58	HGG	O	56	N	+	–	Partial
4	23 mo.	F	69	HGG	P T	14	N	–	/	Partial
5	19 mo.	M	64	HGG	F	194	Inv.+N	–	–	Radical
6	12,5 mo.	F	69	HGG	P O	70	Inv.+N	–	–	Partial
7	11 mo.	F	77	HGG	T	34	Inv.+N	–	–	Radical
8	10 mo.	F	71	HGG	P O	60	Inv.+N	/	–	Radical
9	9.5 mo.	M	72	HGG	T	170	Inv.+N	+	–	Biopsy
10	7.5 mo.	F	73	HGG	P F	59	Inv.+N	+	–	Radical
11	6 mo.	M	66	HGG	O	92	Inv.+N	+	–	Partial
12	5 mo.	F	69	HGG	P	43	Inv.+N	–	–	Biopsy
13	3 mo.	M	60	HGG	T	62	Inv+N	–	–	Partial
14	3 mo.	M	61	HGG	T M	13	Inv.+N	–	–	Data unknown

y = year, mo. = months, LGG = low-grade glioma (diffuse astrocytoma, grade II glioma), HGG = high-grade glioma (glioblastoma, grade III+IV glioma), MGMT = Methylated, IDHI = isocitrat dehydrogenase

*Tumour location, I = insula, P = parietal lobe, O = occipital lobe, T = temporal lobe, F = frontal lobe

†Tumour volume in cc was determined using 3D Slicer 4.5, an open-source segmentation software platform (http://www.slicer.org). ‡ Growth pattern, H = hypometabolic, Inv. = invasive growth with only hotspots, N = hypometabolism representing necrosis in centre of tumour.

+ Present, - Not present, /Missing data

Supplemental Table 2.
Total hemispheric glucose metabolic ratio values and results of visual diaschisis assessment in the cerebrum for each patient with glioma

Survival	Patient ID	Pre-treatment		Post-operative		After radio- or chemotherapy, or no treatment		After chemotherapy or no treatment		After chemotherapy or no treatment		After chemotherapy or no treatment	
		THGr	Visual	THGr	Visual	THGr	Visual	THGr	Visual	THGr	Visual	THGr	Visual
>3y	1	0.87	/	0.73	++	0.86	++	0.60	+	0.20	/		
>3y	2	0.97	/	0.75	+	0.77	+	†		0.89	/		
>3y	3	1.00	+	1.06	-	0.93	+	1.00	+	1.05	/	0.83	+
23 mo.	4	0.74	++	0.68	+	0.73	/	0.52	+	1.73	+		
19 mo.	5	0.62	/	0.94	+	0.69	++	0.95	++	0.45	++		
12,5 mo.	6	1.00	-	1.19	-	0.94	-						
11 mo.	7	0.74	+	0.78	+	0.51	++						
10 mo.	8	0.57	+	0.53	+	0.51	+						
9.5 mo.	9	0.23	++	0.59	++	0.65	++						
7.5 mo.	10	0.50	++	0.65	++	0.38	++						
6 mo.	11	1.08	++	*4.05	++	0.97	++						
5 mo.	12	0.51	+	0.57	++	0.44	++						
3 mo.	13	0.53	++	0.41	++								
3 mo.	14	0.71	+	*0.75	++								

* Only biopsy was performed. † PET scan missing due to technical error in the session. Visual assessment of diaschisis: - = Normal (symmetric), / = Equivocal, + = Probably diaschisis (hypometabolism in 2-3 lobes in the same hemisphere), ++ = Confirmed diaschisis (hypometabolism in four lobes).

Table 1 shows a high prevalence of cerebral diaschisis in gliomas, especially in patients with shorter survival, and it was associated with low THGr (<0.62). Visual assessment of diaschisis was subjective, time-consuming, and challenging, whereas THGr estimation was straightforward

Supplemental Table 3.

Total hemispheric glucose metabolic ratio values and results of visual diaschisis assessment in the cerebellum for each patient with glioma

Survival	Patient ID	Pre-treatment		Postoperative		After radio- or chemotherapy, or no treatment		After chemotherapy or no treatment		After chemotherapy or no treatment		After chemotherapy or no treatment	
		THGr	Visual	THGr	Visual	THGr	Visual	THGr	Visual	THGr	Visual	THGr	Visual
>3y	1	1.18	-	0.73	++	0.80	++	0.86	++	0.85	-		
>3y	2	1.19	-	0.50	++	1.09	-	†		1.12	-		
>3y	3	1.02	-	1.03	-	1.00	-	1.03	-	0.95	-	1.08	-
23 mo.	4	0.87	+	1.04	-	0.84	-	1.08	+	0.55	++		
19 mo.	5	0.52	+	0.89	-	0.67	-	0.98	-	0.16	+		
12,5 mo.	6	0.93	+	0.42	+	0.23	+						
11 mo.	7	0.83	+	0.85	+	0.65	+						
10 mo.	8	0.87	+	0.88	+	0.84	+						
9.5 mo.	9	0.53	++	0.43	++	0.61	++						
7.5 mo.	10	0.78	++	0.52	++	0.71	++						
6 mo.	11	0.61	+	*0.55	++	0.46	++						
5 mo.	12	0.83	+	0.78	++	0.83	+						
3 mo.	13	0.59	++	0.83	++								
3 mo.	14	0.93	+	*0.79	+								

* Only biopsy. was performed .† PET scan missing due to technical error in the session. Visual assessment of diaschisis. - = Normal (symmetric), / = Equivocal, + = Probably diaschisis (hypometabolism in 2-3 lobes in the same hemisphere), ++ = Confirmed diaschisis (hypometabolism in four lobes).

Table 2. The table shows a high prevalence of diaschisis in in gliomas, especially in patients with shorter survival, and it was associated with low

THGr (<0.84)

Supplemental Table 4. Variability due to reuse of the baseline mask in follow-up PET scans.

Parameter	Mean difference (95% CI)	P value
SUVmax	0.01 (-0.10 to 0.13)	0.80
SUVmean	0.012 (-0.06 to 0.08)	0.73
PVc SUVmean	0.03 (-0.12 to 0.2)	0.63
Metabolic volume	-0.19 (-4.2 to 3.8)	0.92
THG (Metabolic volume x SUVmean)	5.77 (-24.7 to 36.3)	0.71
THG PVc	12.25 (-30.2 to 54.7)	0.57

SUVmax = maximum standardized uptake value, SUVmean = mean standardized uptake value; PVc = partial volume corrected, THG = total hemispheric glucose metabolism rate.

Automated reuse of the baseline mask in follow-up PET scans can result in serious deviations in the outcome SUV variables. For validation of this automated procedure, 21 FDG-PET scans (chosen due to heterogeneity in patient movement between scans) were also segmented independently, i.e. the operator manually aligned the baseline mask to the follow-up PET scan. The Wilcoxon matched-pairs signed-ranks test was used to compare the two methods. Visual analysis was also performed for validation of the location of the interpolated masks. The results in the table show that the software could provide reliable automated reuse of cerebral hemispheric and whole cerebellar baseline masks. We also compared reuse of baseline masks stratified to any specific treatment intervention (i.e. postoperative or post-chemotherapy), but no statistically significant difference was found (p values ranged from 0.055 to 0.96). The large mask size and the relatively fixed anatomical shape of the target structures could explain these good results, which indicate that the automated reuse of cerebral hemispheric and cerebellar masks provided in the ROVER software is applicable for routine clinical use.

Supplemental Figure 1: Quantification of diaschisis in the cerebellum of a patient with glioblastoma.

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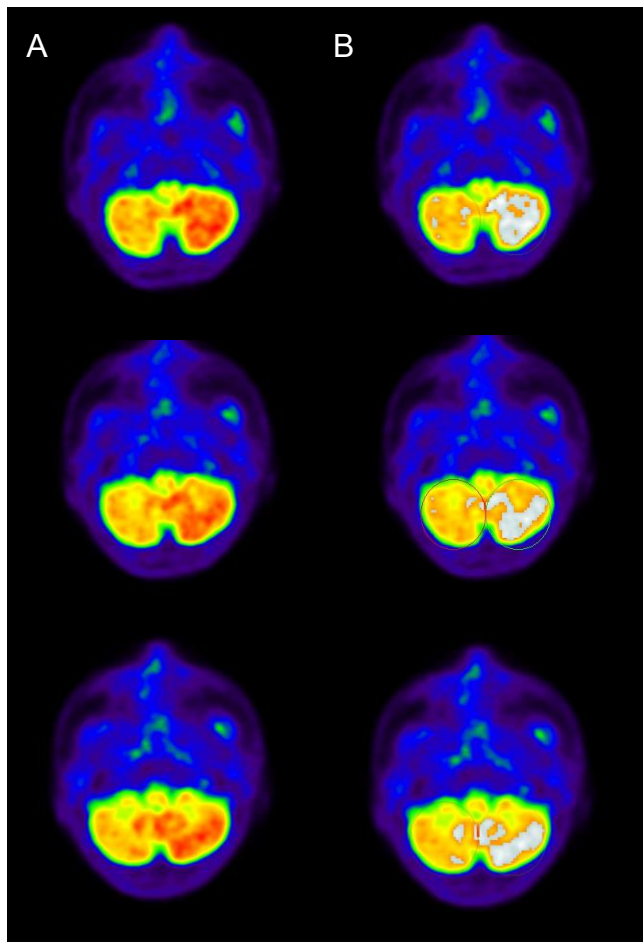
FDG-PET scan and three consecutive trans-axial images. (A) Diaschisis seen in the contralateral cerebellar hemisphere to the supratentorial tumour. (B) Total hemispheric glucose metabolic ratio (THGr) in cerebellum was 0.65, which was less than in healthy controls and patients surviving > 1 year.

Supplemental Figure 2. Inter-rater variability for total hemispheric glucose metabolism ratio (THGr) for cerebrum and cerebellum.
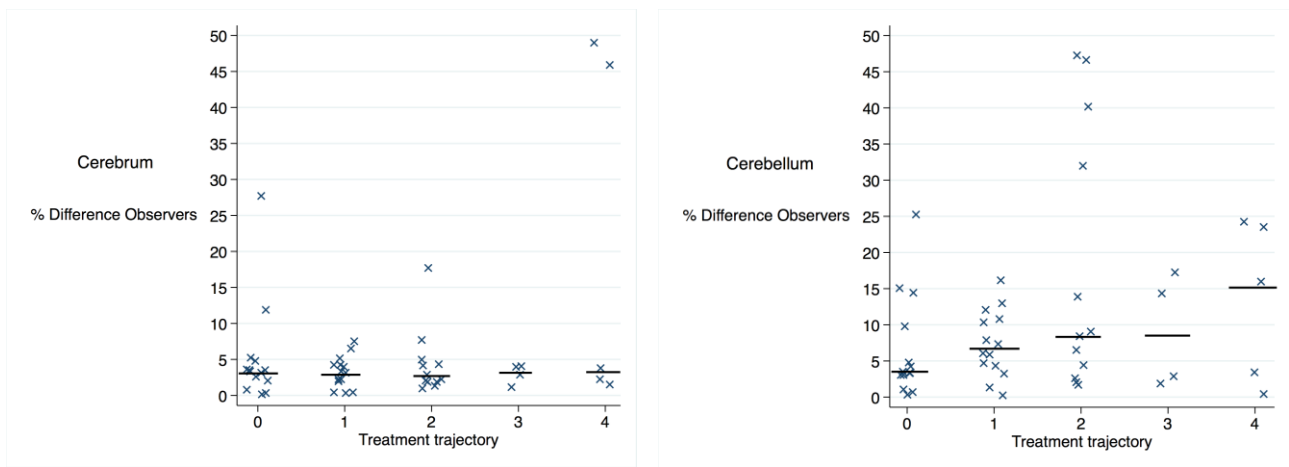
0= Before any treatment intervention, 1= After resection or biopsy, 2= After radio- or chemotherapy, 3= After chemotherapy, 4= During chemotherapy/No treatment.

Two independent observers independently used the THGr method in the glioma cohort. The scatter plot and median illustrate the coefficient of variation as percentage difference between two independent observers of THGr outcome in cerebrum and cerebellum . In total, 50 PET scans were independently analysed by two observers.