

Appendix 1*The retrieval formula for the search of Medline and Web of Science***Medline**

((("Glioma"[Mesh] OR (((((((glioma*[Title/Abstract] OR (astrocytoma*[Title/Abstract])) OR (oligodendroglioma*[Title/Abstract])) OR (glioblastoma*[Title/Abstract])) OR (oligo-dendroglioma*[Title/Abstract])) OR (oligoastrocytoma*[Title/Abstract])) OR (oligo-astrocytoma*[Title/Abstract])) OR (GBM[Title/Abstract])) OR (LGG[Title/Abstract])) OR (HGG[Title/Abstract]))) AND (("Positron-Emission Tomography"[Mesh] OR (((((((((((positron emission tomography[Title/Abstract] OR (positron-emission tomography imaging*[Title/Abstract])) OR (imaging*, positron-emission tomography[Title/Abstract])) OR (positron emission tomography imaging*[Title/Abstract])) OR (tomography imaging*, positron-emission[Title/Abstract])) OR (tomography, positron-emission[Title/Abstract])) OR (tomography, positron emission[Title/Abstract])) OR (PET[Title/Abstract])) OR (PET scan*[Title/Abstract])) OR (scan*, PET[Title/Abstract])) OR (PET imaging*[Title/Abstract])) OR (imaging*, PET[Title/Abstract]))) AND ((((((pseudoprogression[Title/Abstract] OR (pseudo-progression[Title/Abstract])) OR (psPD[Title/Abstract])) OR (PsP[Title/Abstract])) OR (progression[Title/Abstract])) OR (true progression[Title/Abstract])) OR (TP[Title/Abstract])) OR (TPR[Title/Abstract]))

Web of science

TS1 = (glioma* OR astrocytoma* OR oligodendroglioma* OR glioblastoma* OR oligo-dendroglioma* OR oligoastrocytoma* OR oligo-astrocytoma* OR GBM OR LGG OR HGG) AND TS2 = (positron-emission tomography OR positron emission tomography OR positron-emission tomography imaging* OR imaging*, positron-emission tomography OR positron emission tomography imaging* OR tomography imaging*, positron-emission OR tomography, positron-emission OR tomography, positron emission OR PET OR PET scan* OR scan*, PET OR PET imaging* OR imaging*, PET) AND TS3 = (pseudoprogression OR pseudo-progression OR psPD OR PsP OR progression OR true progression OR TP OR TPR)

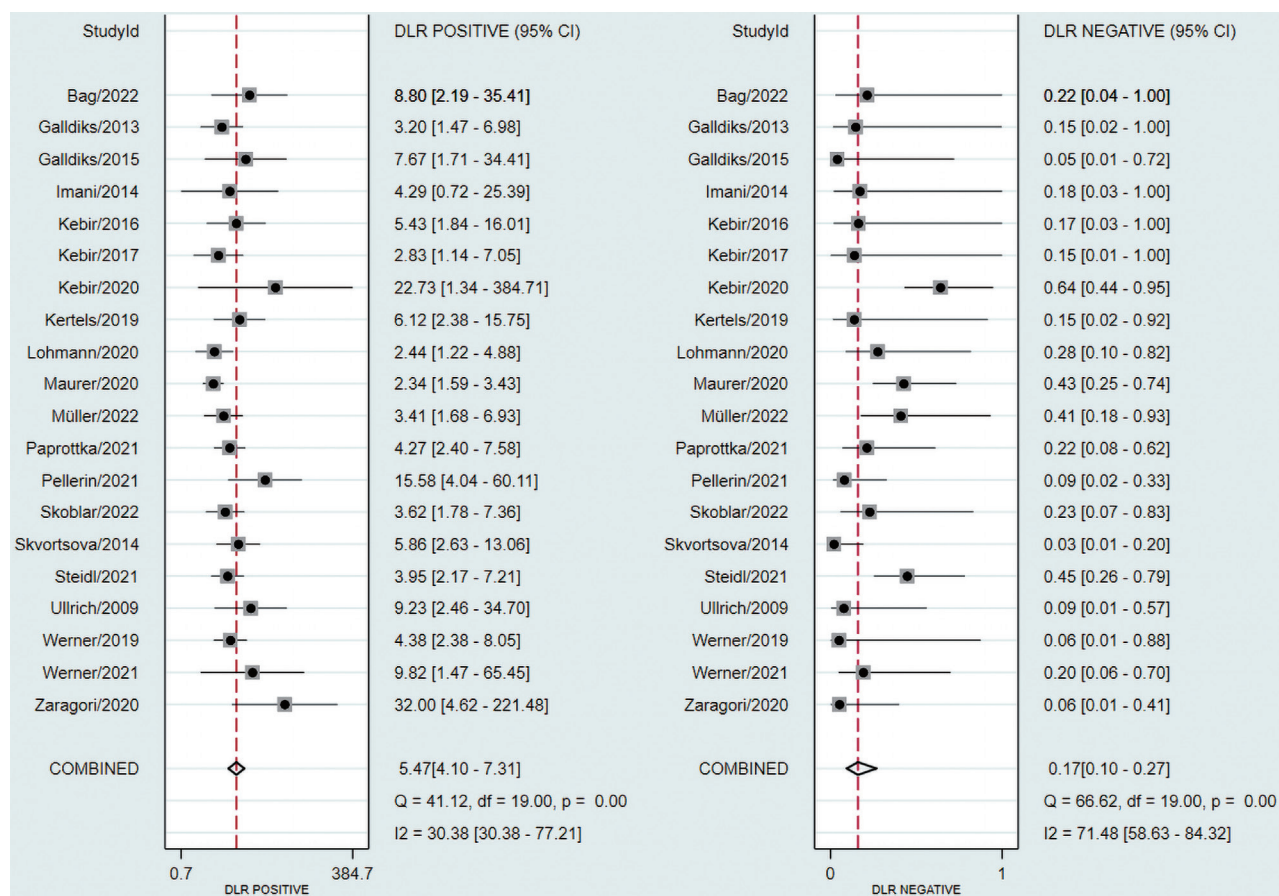


Figure S1 Forest plot positive likelihood ratios and negative likelihood ratios of the included studies. DLR, diagnostic likelihood ratio.

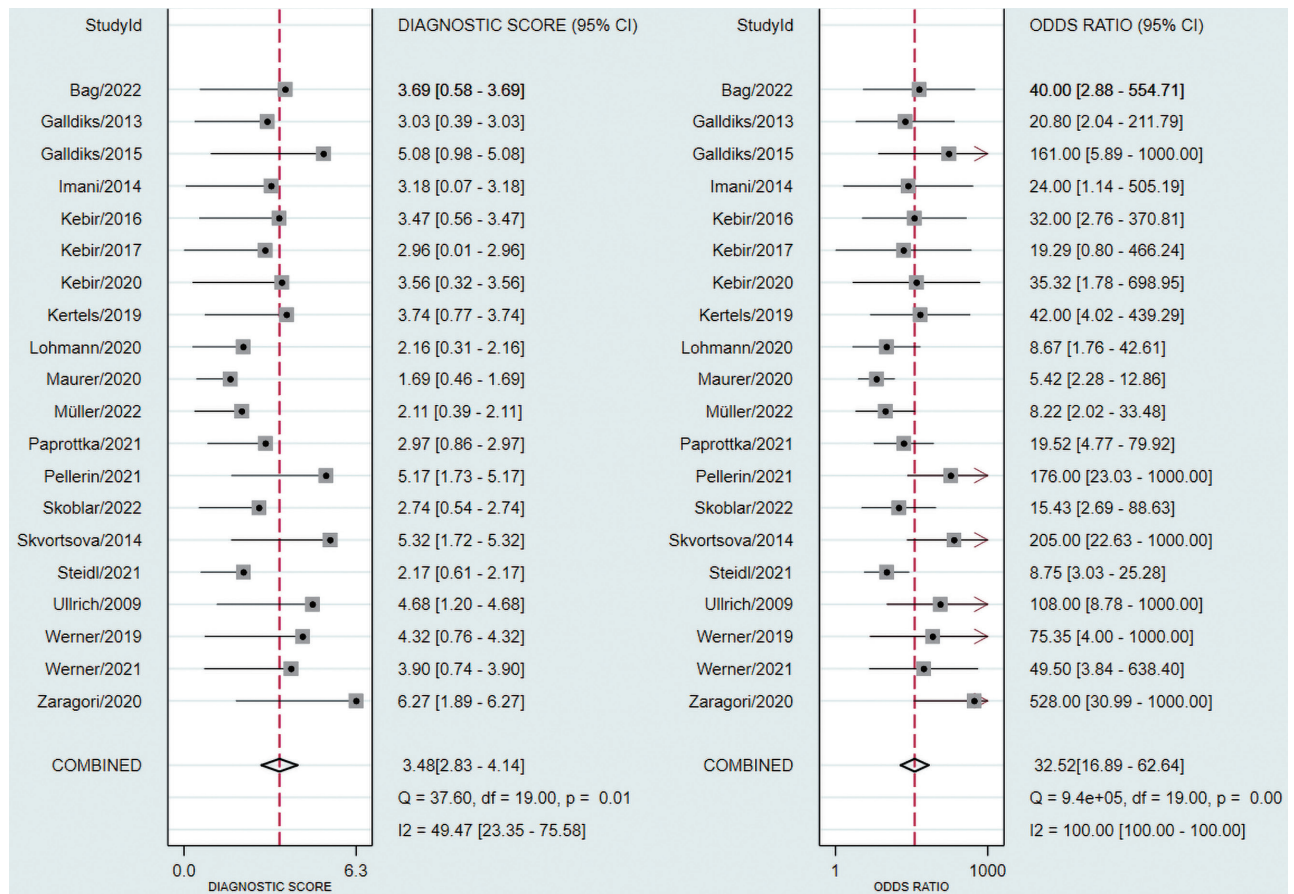


Figure S2 Forest plot diagnostic score and odds ratio of the included studies.

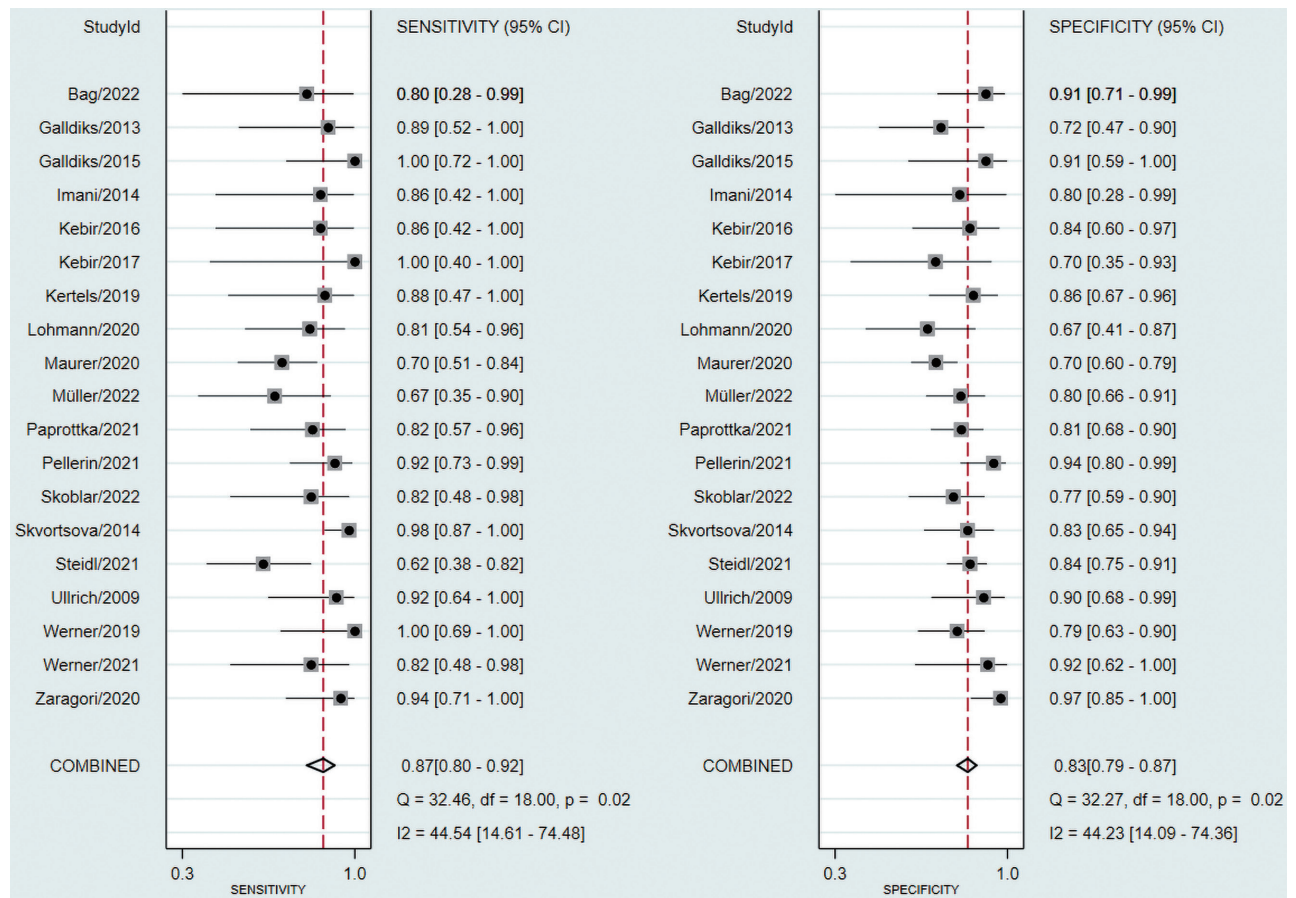


Figure S3 Forest plot sensitivities and specificities of the included studies except the study of Kebir *et al.* (40).

Table S1 Complete information of included studies

No.	First author (Refs.)	Journal (abbreviated)	Period of study	Patient selection	Methylated/unmethylated (MGMT-status)	Mutant/wild type (IDH-status)	Interval of PET scan to suspicious progression	PET modality	Radiotracer dose	Time of PET scan after tracer injection	Method of analysis	ICC	Sensitivity	Specificity	Accuracy	AUC
1	Bag, AK	<i>J Nucl Med</i>	2009–2020/5	Continuously	NR	NR	0–21 days	PET	740 MBq	5–15 min	Semiquantitative & visual inspection	NR	1.00	0.60	0.67	NR
													0.80	0.90	0.89	NR
													1.00	0.77	0.81	NR
													0.40	0.72	0.67	NR
2	Galldiks, N	<i>J Nucl Med</i>	2006–2011	Continuously	NR	NR	20±13 days	PET (dynamic)	200 MBq	<50 min	Semiquantitative (dynamic contrast)	NR	0.89	0.72	0.78	0.87
													0.78	0.72	0.74	0.80
													0.89	0.72	0.78	0.78
													0.89	0.72	0.78	NR
3	Galldiks, N	<i>Eur J Nucl Med Mol Imaging</i>	2009–2012	Continuously	8/13	NR	0–7 days	PET (dynamic)	200 MBq	<50 min	Semiquantitative	NR	1.00	0.91	0.95	0.94
													0.82	0.82	0.82	0.90
													0.91	0.80	0.86	NR
													0.91	0.60	0.77	NR
4	Imani, F	<i>Eur J Radiol</i>	2007/3–2009/3	NR	NR	NR	NR	PET	353–532 MBq	46–68 min	Semiquantitative & quantitative	NR	1.00	0.40	0.75	NR
													0.86	0.80	0.83	NR
5	Kebir, S	<i>Clin Cancer Res</i>	NR	NR	17/8	NR	NR	PET (dynamic)	200 MBq	<50 min	Semiquantitative	NR	0.86	0.84	0.85	0.88
													0.86	0.74	0.77	0.86
6	Kebir, S	<i>Oncotarget</i>	NR	NR	12/2	NR	NR	PET & CT	200 MBq	20 min	Semiquantitative & texture analysis	NR	1.00	0.70	0.79	NR
													0.75	0.90	0.86	NR
7	Kebir, S	<i>Cancers (Basel)</i>	NR	NR	25/17	0/44	NR	PET (dynamic)	3 MBq/kg	<50 min	Semiquantitative	NR	0.86	0.50	0.61	0.68
													0.36	1.00	0.80	0.74
													0.00	1.00	0.68	0.55
													0.80	1.00	0.93	0.93
8	Kertels, O	<i>Clin Nucl Med</i>	2010/4 – 2016/8	Continuously	8/9	NR	NR	PET & CT	217±13 MBq	20 min	Semiquantitative	NR	1.00	0.64	0.72	0.84
													0.88	0.86	0.86	0.86
													0.88	0.79	0.81	0.86
													1.00	0.61	0.69	0.83
													0.88	0.71	0.75	0.80
													0.75	0.86	0.83	0.81
													0.75	0.82	0.81	0.82
													0.88	0.86	0.86	0.87
													0.88	0.82	0.83	0.88
													1.00	0.64	0.72	0.85
9	Lohmann, P	<i>Cancers (Basel)</i>	NR	Continuously	12/20	1/33	7–10 days	PET (dynamic)	3 MBq/kg	<40 min	Semiquantitative & radiomics analysis	NR	0.81	0.67	0.74	0.79
													0.75	0.61	0.68	0.73
													0.75	0.44	0.59	0.61
													0.56	0.61	0.59	0.55
													0.75	0.72	0.74	NR
													0.69	0.78	0.74	NR
													0.50	0.78	0.65	NR
													0.69	0.83	0.76	NR
													0.50	0.89	0.71	NR
													0.56	0.61	0.59	NR
10	Maurer, GD	<i>J Nucl Med</i>	2016/3–2019/1	Unclear	57/40	51/70	NR	PET (dynamic)	3 MBq/kg	<50 min	Semiquantitative	NR	0.71	0.70	0.70	0.76
													0.79	0.56	0.62	0.75
													0.88	0.54	0.63	0.69
													0.67	0.86	0.81	NR

Table S1 (continued)

Table S1 (continued)

No.	First author (Refs.)	Journal (abbreviated)	Period of study	Patient selection	Methylated/unmethylated (MGMT-status)	Mutant/wild type (IDH-status)	Interval of PET scan to suspicious progression	PET modality	Radiotracer dose	Time of PET scan after tracer injection	Method of analysis	ICC	Sensitivity	Specificity	Accuracy	AUC
11	Müller, M	<i>J Neurooncol</i>	NR	NR	72/50	59/92	NR	PET (dynamic)	3 MBq/kg	<50 min	Semiquantitative & radiomics analysis	NR	0.67	0.80	0.78	0.78
12	Paprottka, KJ	<i>Eur J Nucl Med Mol Imaging</i>	2017/12–2020/4	Continuously	38/29	25/47	NR	PET	185±18.5 MBq	<40 min	Semiquantitative	NR	0.82	0.81	0.81	NR
13	Pellerin, A	<i>Eur Radiol</i>	2015/12–2018/1	Continuously	NR	43/15	NR	PET & MRI	2 MBq/kg	10 min	Quantitative & semiquantitative	NR	0.92	0.94	0.93	0.93
													0.58	1.00	0.83	0.79
													0.79	0.94	0.88	0.90
14	Skoblar, VM	<i>Int J Mol Sci</i>	2019/4–2021/10	Continuously	NR	26/18	84–103 weeks	PET	3 MBq/kg	Immediately	Semiquantitative	NR	0.82	0.77	0.79	0.82
													0.91	0.71	0.76	0.84
													0.91	0.48	0.60	0.63
													1.00	0.58	0.69	0.83
15	Skvortsova, TY	<i>Zh Vopr Neurokhir Im N N Burdenko</i>	NR	NR	NR	NR	NR	PET	NR	NR	Semiquantitative	NR	0.98	0.83	0.92	NR
16	Steidl, E	<i>Eur J Nucl Med Mol Imaging</i>	2016/2–2019/12	NR	52/35	33/69	NR	PET	NR	NR	Semiquantitative	Yes	0.62	0.70	0.68	0.72
													0.62	0.84	0.80	0.69
													0.43	0.96	0.86	NR
17	Ullrich, RT	<i>J Nucl Med</i>	1993–2006	NR	NR	NR	NR	PET	740 MBq	20–60 min	Semiquantitative (dynamic contrast)	NR	0.92	0.90	0.91	0.96
18	Werner, JM	<i>Eur J Nucl Med Mol Imaging</i>	2012–2018	NR	23/24	10/37	16±15 days	PET & MRI (dynamic)	3 MBq/kg	<50 min	Semiquantitative	Yes	1.00	0.79	0.83	0.89
													1.00	0.79	0.83	0.89
													0.80	0.68	0.71	0.79
													0.70	0.74	0.73	0.82
													0.90	0.90	0.90	NR
													0.80	0.97	0.94	NR
19	Werner, JM	<i>Clin Cancer Res</i>	2018–2020	NR	23/0	0/23	0–26 days	PET (dynamic)	3 MBq/kg	<50 min	Semiquantitative (dynamic contrast)	NR	0.82	0.92	0.87	0.77
													0.64	0.92	0.78	0.75
													0.73	0.75	0.74	0.72
													0.64	0.83	0.74	0.82
													0.55	1.00	0.78	NR
													0.36	1.00	0.70	NR
20	Zaragori, T	<i>EJNMMI Res</i>	2012/10–2017/10	NR	NR	23/28	NR	PET & CT (dynamic)	3 MBq/kg	<30 min	Semiquantitative (dynamic contrast)	NR	0.94	0.97	0.96	0.97
													0.94	0.94	0.94	0.98
													0.94	0.97	0.96	0.98
													1.00	0.91	0.94	0.99
													0.94	0.97	0.96	0.98
													0.94	0.68	0.77	0.82

¹¹C-MET, (S-¹¹C-methyl)-L-methionine; ¹⁸F-FDG, 2-¹⁸F-fluoro-2-deoxy-D-glucose; ¹⁸F-FDOPA, 3,4-dihydroxy-6-¹⁸F-fluoro-L-phenylalanine; ¹⁸F-FET, O-(2-¹⁸F-fluoroethyl)-L-tyrosine; CT, computed tomography; ICC, interobserver consistency check; IDH, isocitrate dehydrogenase; MGMT, O⁶-methylguanine-DNA methyl-transferase; MRI, magnetic resonance imaging; MTV, metabolic tumor volume; NA, not applicable; NR, not reported; NS, not specified; nSUVmax, maximal SUV of the lesion divided by maximal SUV of contralateral normal white matter; PET, positron emission tomography; PsP pseudoprogression; RANO, Response Assessment in Neuro-Oncology; SUV, standardized uptake value; TAC, time activity curve; TBR, tumor-to-brain ratio; TPR, true glioma progression; TSR, tumor-to-striatum ratio; TTP, time-to-peak; WHO, World Health Organization; zAI, z-score of the asymmetry index.