KQ5. 뇌교종/뇌전이암 환자에서 재발진단 및 치료반응 평가를 위하여 아미노산 PET/CT를 기존 영상검사에 추가로 시행하는 것이 적절한가?

출처 문헌번호	문헌정보	연구유형	대상자수	연구결과	Study quality (KCIG)
418_69	Galldiks N, Langen K, Holy R, et al. Assessment of treatment response in patients with glioblastoma using [18F]fluoroethyl-L-tyrosine PET in comparison to MRI. J Nucl Med. 2012;53: 1048–1057.	Observational study (Prospective)	8	Stable or decreasing FET uptake, even in contrast-enhancing lesions, is suggestive of reactive changes, whereas increasing ratios appear always to be indicative of recurrence. Therefore, FET PET is more reliable than MRI in differentiating stable disease from tumour regrowth.	2
418_70	Galldiks N, Kracht LW, Burghaus L, et al. Use of 11C-methionine PET to monitor the effects of temozolomide chemotherapy in malignant gliomas. Eur J Nucl Med Mol Imaging. 2006;33(5): 516–524.	Observational study (Prospective)	15	Tumour responses can already be demonstrated with MET-PET after three cycles of chemotherapy, and absence of progression at that time indicates a high probability of further stability during the next three cycles. A reduction in MET uptake during TMZ treatment predicts a favourable clinical outcome.	2
418_71	Jansen NL, Suchorska B, Schwarz SB, et al. [18F]fluoroethyltyrosinepositron emission tomography-based therapy monitoring after stereotactic iodine-125 brachytherapy in patients with recurrent high-grade glioma. Mol Imaging. 2013;12:137–147.	Observational study (Prospective)	33	Maximal standardized background uptake value (SUVmax/BG) and biologic tumor volume (BTV) differentiated accurately between therapeutic effects and local tumor progression at the 6-month and subsequent examinations.	2
418_72	Po¨pperl G, Goldbrunner R, Gildehaus FJ, et al. O-(2-[18F]fluoroethyl)-L-tyrosine PET for monitoring the effects of convection-enhanced delivery of paclitaxel in patients with recurrent glioblastoma. Eur J Nucl Med Mol Imaging. 2005;32:1018–1025.	Observational study (Prospective)	8	In long-term follow-up, stable or decreasing FET uptake, even in contrast-enhancing lesions, is suggestive of reactive changes, whereas increasing ratios appear always to be indicative of recurrence.	2
418_73	Po¨ pperl G, Go¨ tz C, Rachinger W, et al. Serial O-(2-[(18)F]fluoroethyl)-L:-tyrosine PET for monitoring the effects of intracavitary radioimmunotherapy in patients with malignant glioma. Eur J Nucl Med Mol Imaging. 2006;33:792–800.	Observational study (Prospective)	24	Homogeneous, slightly increasing FET uptake around the tumour cavity with a peak up to 18 months after RIT, followed by stable or decreasing uptake, points to benign, therapy-related changes.	2
418_74	Galldiks N, Dunkl V, Stoffels G, et al. Diagnosis of pseudoprogression in patients with glioblastoma using O-(2-[18F]fluoroethyl)-L-tyrosine PET. Eur J Nucl Med Mol Imaging. 2015;42(5):685–695.	Observational study (Retrospective)	22	18F-FET uptake was significantly lower than in patients with EP (TBRmax 1.9 ± 0.4 vs. 2.8 ± 0.5, TBRmean 1.8 ± 0.2 vs. 2.3 ± 0.3; both P < 0.001) and presence of MGMT promoter methylation was significantly more frequent (P = 0.05).	2
418_37	Chen W, Silverman DH, Delaloye S, et al. 18F-FDOPA PET imaging of brain tumors: comparison study with 18F-FDG PET and evaluation of diagnostic accuracy. J Nucl Med. 2006;47(6): 904–911.	Observational study (Prospective)	30	18F-FDOPA PET was more accurate than 18F-FDG PET for imaging of low-grade tumors and evaluating recurrent tumors	2
418_79	Herrmann K, Czernin J, Cloughesy T, et al. Comparison of visual and semiquantitative analysis of 18F-FDOPA-PET/CT for recurrence detection in glioblastoma patients. Neuro Oncol. 2014;16(4):603–609.	Observational study (Retrospective)	110	. Accuracies for detection of glioblastoma recurrence were similar for visual (82%) and semiquantitative (range, 77%–82%) analysis. Both visual and semiquantitative indices were significant predictors of PFS, with mean lesion-to normal brain tissue ratios providing the best discriminator (mean survival, 39.4 vs 9.3 months; P < ..001).	2
418_80	Walter F, Cloughesy T, Walter MA, et al. Impact of 3,4-dihydroxy-6-18F-fluoro-L-phenylalanine PET/CT on managing patients with brain tumors: the referring physician's perspective. J Nucl Med. 2012;53(3):393–398.	Observational study (Prospective)	58	18F-DOPA PET/CT changed the intended management of 41% of patients with brain tumors, and intended management changes were implemented in 75% of these. These changes suggest a potentially important clinical role of imaging amino acid transport in the management of brain tumor patients.	2
406_32	Albert NL, Weller M, Suchorska B, Galldiks N, Soffietti R, Kim MM, et al. Response Assessment in Neuro-Oncology working group and European Association for Neuro-Oncology recommendations for the clinical use of PET imaging in gliomas. Neuro Oncol. 2016;. doi:10.1093/neuonc/now058.	Guideline			1
363_17	Beppu T, Sato Y, Sasaki T et al (2019) Comparisons between PET With 11C-methyl-l-methionine and arterial spin labeling perfusion imaging in recurrent glioblastomas treated with bevacizumab. Clin Nucl Med 44:186–193	Observational study (Prospective)	24	T/N ratios, fluctuations in ratio, and tumor volumes correlated significantly between ASL and 11C-met-PET at all time points and all periods. Arterial spin labeling was eligible as a predictor for long PFS only in assessment of fluctuations in T/N ratio. However, the most accurate predictors for long PFS were T/N ratio from 11C-met-PET at 8 weeks and the fluctuation from baseline to 4 weeks in T/N ratio from 11C-met-PET.	2
363_38	Beppu T, Terasaki K, Sasaki T et al (2016) MRI and 11C-methyll-methionine PET differentiate bevacizumab true responders after initiating therapy for recurrent glioblastoma. Clin Nucl Med 41:852–857	Observational study (Prospective)	20	Combined assessment with MRI and MET-PET at 8 weeks can differentiate true responders who are predicted to show more favorable prognosis from pseudoresponders.	2
363_42	Evangelista L, Cuppari L, Bellu L et al (2019) Comparison between 18F-dopa and 18F-Fet PET/CT in patients with suspicious recurrent high grade glioma: a literature review and our experience. Curr Radiopharm 12:220–228	Review+ Observationsl study (retrospective)	29	18F-DOPA and 18F-FET PET/CT have a similar diagnostic accuracy in patients with recurrent HGG.	2
363_43	Kebir S, Fimmers R, Galldiks N et al (2016) Late pseudoprogression in glioblastoma: diagnostic value of dynamic O-(2-[18F] fluoroethyl)-l-tyrosine PET. Clin Cancer Res 22:2190–2196	Observational study (Retrospective)	26	TBRmax and TBRmean were significantly higher in patients with true progression than in patients with late psueudoprgression (TBRmax 2.4 ± 0.1 vs. 1.5 ± 0.2, P =0.003; TBRmean 2.1 ± 0.1 vs. 1.5 ± 0.2, P = 0.012) whereas TTP (time-to-peak) was significantly shorter (mean TTP 25 ± 2 vs. 40 ± 2 min, P <0.001).	2
363_44	Galldiks N, Dunkl V, Stoffels G et al (2015) Diagnosis of pseudoprogression in patients with glioblastoma using O-(2-[18F] fluoroethyl)-l-tyrosine PET. Eur J Nucl Med Mol Imaging 42:685–695	Observational study (Retrospective)	22	18F-FET uptake was significantly lower than in patients with EP (TBRmax 1.9 ± 0.4 vs. 2.8 ± 0.5, TBRmean 1.8 ± 0.2 vs. 2.3 ± 0.3; both P < 0.001) and presence of MGMT promoter methylation was significantly more frequent (P = 0.05).	2

363_45	Galldiks N, Rapp M, Stoffels G et al (2013) Response assessment of bevacizumab in patients with recurrent malignant glioma using [18F]Fluoroethyl-l-tyrosine PET in comparison to MRI. Eur J Nucl Med Mol Imaging 40:22–33	Observational study (Prospective)	10	Both standard and kinetic imaging parameters derived from18F-FET PET seem to predict BEV/IR treatment failure and thus contribute important additional information for clinical management over and above the information obtained by MRI response assessment based on RANO criteria.	2
363_46	George E, Kijewski MF, Dubey S et al (2018) Voxel-wise analysis of fluoroethyltyrosine PET and MRI in the assessment of recurrent glioblastoma during antiangiogenic therapy. AJR Am J Roentgenol 211:1342–1347	Observational study (Prospective)	11	sity. High posttreatment-to-pretreatment FET PET uptake ratio and increase in correlation between PET uptake and contrast-enhanced T1 signal inten-sity after bevacizumab treatment are associated with poor PFS	2
363_51	Humbert O, Bourg V, Mondot L et al (2019) (18)F-DOPA PET/CT in brain tumors: impact on multidisciplinary brain tumor board decisions. Eur J Nucl Med Mol Imaging 46:558–568	Observational study (Prospective)	106	The addition of 18F-DOPA PET data changed the diagnosis and treatment plan in 39.0% and 17.1% of patients' cases, respectively. Concerning patients with a suspicion of recurrent glioblastoma (N = 12), the implementation of 18F-DOPA PET changed the diagnosis and treatment plan in 33.3% of cases. In patients evaluated to assess residual glioblastoma infiltration after treatment (N = 53), 18F-DOPA PET data had a lower impact with only 5.7% (3/53) of diagnostic changes and 3.8% (2/53) of therapeutic plan changes.	2
363_36	Karunanithi S, Sharma P, Kumar A et al (2013) 18F-FDOPA PET/CT for detection of recurrence in patients with glioma: prospective comparison with 18F-FDG PET/CT. Eur J Nucl Med Mol Imaging 40:1025–1035	Observational study (Prospective)	28	The sensitivity, specificity and accuracy of 18FFDG PET/CT were 47.6 %, 100 % and 60.7 %, respectively, and those of 18F-FDOPA PET/CT were 100 %, 85.7 % and 96.4 %, respectively. 18F-FDOPA PET/CT is highly sensitive and specific for detection of recurrence in glioma patients. It is superior to 18F-FDG PET/CT for this purpose and is especially advantageous in patients with low-grade gliomas.	2
363_52	Karunanithi S, Bandopadhyaya GP, Sharma P et al (2014) Prospective comparison of (99m)Tc-GH SPECT/CT and (18) F-FDOPA PET/CT for detection of recurrent glioma: a pilot study. Clin Nucl Med 39:e121-128	Observational study (Prospective)	30	Based on reference standard, 22 patients were positive and 8 were negative for recurrence. 99mTc-GH SPECT/CT was positive for recurrence in 22 and negative in 8 patients. 18F-FDOPA PET/CT scan was positive for recurrence in 23 and negative in 7 patients. Sensitivity, specificity, and accuracy were 86.4%, 62.5%, and 80% for 99mTc-GH SPECT/CT and 100%, 87.5%, and 96% for 18F-FDOPA PET/CT, respectively.	2
363_53	Karunanithi S, Sharma P, Kumar A et al (2013) Comparative diagnostic accuracy of contrast-enhanced MRI and (18)F-FDOPA PET-CT in recurrent glioma. Eur Radiol 23:2628–2635	Observational study (Prospective)	35	n F-FDOPA PET-CT shows a high but comparable diagnostic accuracy to Ce-MRI for the detection of recurrent glioma. However, it is more specific than Ce-MRI.	2
377_30	Albert NL, Weller M, Suchorska B, Galldiks N, Soffietti R, Kim MM, et al. Response Assessment in Neuro-Oncology working group and European Association for Neuro-Oncology recommendations for the clinical use of PET imaging in gliomas. Neuro-oncol 2016;18:1199–208.	Guideline			1
377_34	Roelcke U, Wyss MT, Nowosielski M, Rudà R, Roth P, Hofer S, et al. Amino acid positron emission tomography to monitor chemotherapy response and predict seizure control and progression-free survival in WHO grade II gliomas. Neuro-oncol 2016;18:744–51.	Observational study (Retrospective)	33	. Amino acid PET is superior to MRI for evaluating TMZ responses in WHO grade II glioma patients. The response delay between both imaging modalities favors amino acid PET for individually tailoring the duration of chemotherapy.	2
464_32	Nuutinen J, Sonninen P, Lehikoinen P. Radiotherapy treatment planning and long-term follow-up with [(11)C] methionine PET in patients with low-grade astrocytoma. Int J Radiat Oncol Biol Phys 2000; 48: 43–52.	Observational study (Prospective)	13	In quantitative evaluation, patients with a low tumor SUV initially had significantly better prognosis than those with a high SUV. Tumor-to-contralateral brain uptake ratios of MET discriminated well patients remaining clinically stable from those who have since relapsed or died of disease.	2
추가1_87	Ceccon G, Lohmann P, Stoffels G, et al. Dynamic O-(2-18F-fluoroethyl)-L-tyrosine positron emission tomography differentiates brain metastasis recurrence from radiation injury after radiotherapy. Neuro Oncol. 2017;19(2):281-288.	Observational study (Retrospective)	62	TBRs were significantly higher in recurrent metastases (n = 36) than in radiation injuries (n = 40) (TBRmax 3.3 ± 1.0 vs 2.2 ± 0.4, P < .001; TBRmean 2.2 ± 0.4 vs 1.7 ± 0.3, P < .001). The highest accuracy (88%) for diagnosing local recurrent metastasis could be obtained with TBRs in combination with the slope of time-activity curves (P < .001).	2
추가1_88	Galldiks N, Abdulla DSY, Scheffler M, et al. Treatment monitoring of immunotherapy and targeted therapy using 18F-FET PET in patients with melanoma and lung cancer brain metastases: initial experiences. J Nucl Med. 2021;62(4):464-470.	Observational study (Retrospective)	40	A TBR threshold of 1.95 differentiated BM relapse from treatment-related changes with an accuracy of 85% (P = 0.003). Metabolic responders to ICI or TT on 18F-FET PET had a significantly longer stable follow-up (threshold of TBR reduction relative to baseline, $10%; accuracy, 82%; P = 0.004). Furthermore, at follow-up, time to peak in metabolic responders increased significantly (P = 0.019).	2
추가2_79	Terakawa Y, Tsuyuguchi N, Iwai Y, et al. Diagnostic accuracy of 11C-methionine PET for differentiation of recurrent brain tumors from radiation necrosis after radiotherapy. J Nucl Med. 2008;49(5):694–699.	Observational study (Retrospective)	77	The values of each index of 11C-MET PET tended to be higher for tumor recurrence than for radiation necrosis. There were significant differences between tumor recurrence and radiation necrosis in all of the indices except for the L/Nmax for glioma. ROC analysis indicated that the L/Nmean was the most informative index for differentiating between tumor recurrence and radiation necrosis. An L/Nmean of greater than 1.41 provided the best sensitivity and specificity for metastatic brain tumor (79% and 75%, respectively), and an L/Nmean of greater than 1.58 provided the best sensitivity and specificity for glioma (75% and 75%, respectively).	2
추가2_80	Tsuyuguchi N, Sunada I, Iwai Y, et al. Methionine positron emission tomography of recurrent metastatic brain tumor and radiation necrosis after stereotactic radiosurgery: is a differential diagnosis possible? J Neurosurg. 2003;98(5):1056–1064.	Observational study (Prospective)	21	There were statistically significant differences between the recurrence and necrosis groups in T/N and SUV. Furthermore, the borderline T/N value was 1.42 according to a 2 x 2 factorial table (high T/N or low T/N, recurrence or necrosis). From this result, the sensitivity and specificity of MET-PET scanning in detecting tumor recurrence were determined to be 77.8 and 100%, respectively.	2

추가2_81	Minamimoto R, Saginoya T, Kondo C, et al. Differentiation of brain tumor recurrence from post-radiotherapy necrosis with 11C-Methionine PET: visual assessment versus quantitative assessment. Plos One. 2015;10(7):e0132515.	Observational study (Retrospective)	70	The visual assessment showed no significant difference from quantitative assessment of MET-PET with a relevant cut-off value for the differentiation of recurrent brain tumors from radiation-induced necrosis.	2
추가2_82	Lizarraga KJ, Allen-Auerbach M, Czernin J, et al. (18)F-FDOPA PET for differentiating recurrent or progressive brain metastatic tumors from late or delayed radiation injury after radiation treatment. J Nucl Med. 2014;55(1):30–36.	Observational study (Retrospective)	32	Among the various predictors tested, (18)F-FDOPA PET was the strongest predictor of tumor progression (hazard ratio, 6.26; P < 0.001), and the lesion-to-normal brain tissue ratio or visual score was the best discriminator.	2
추가2_83	Cicone F, Minniti G, Romano A, et al. Accuracy of F-DOPA PET and perfusion-MRI for differentiating radionecrotic from progressive brain metastases after radiosurgery. Eur J Nucl Med Mol Imaging. 2015;42(1):103–111.	Observational study (Prospective)	42	F-DOPA PET is a highly accurate tool for differentiating radionecrosis from tumor progression of brain metastases after stereotactic radiosurgery. In this specific setting, F-DOPA PET seems to perform better than perfusion-MR.	2
추가2_35	Galldiks N, Stoffels G, Filss CP, et al. Role of O-(2-(18)F-fluoroethyl)-Ltyrosine PET for differentiation of local recurrent brain metastasis from radiation necrosis. J Nucl Med. 2012;53(9):1367–1374.	Observational study (Prospective)	31	The highest accuracy (93%) to diagnose local recurrent metastasis was obtained when both a TBRmean greater than 1.9 and curve pattern II or III were present (AUC, 0.959 ± 0.03; sensitivity, 95%; specificity, 91%; P < 0.001). Our findings suggest that the combined evaluation of the TBRmean of 18F-FET uptake and the pattern of the time–activity curve can differentiate local brain metastasis recurrence from radionecrosis with high accuracy.	2
추가2_36	Ceccon G, Lohmann P, Stoffels G, et al. Dynamic O-(2-18F-fluoroethyl)-L-tyrosine positron emission tomography differentiates brain metastasis recurrence from radiation injury after radiotherapy. Neuro Oncol. 2017;19(2):281–288.	Observational study (Retrospective)	62	TBRs were significantly higher in recurrent metastases (n = 36) than in radiation injuries (n = 40) (TBRmax 3.3 ± 1.0 vs 2.2 ± 0.4, P < .001; TBRmean 2.2 ± 0.4 vs 1.7 ± 0.3, P < .001). The highest accuracy (88%) for diagnosing local recurrent metastasis could be obtained with TBRs in combination with the slope of time-activity curves (P < .001).	2
추가2_37	Romagna A, Unterrainer M, Schmid-Tannwald C, et al. Suspected recurrence of brain metastases after focused high dose radiotherapy: can [18F] FET- PET overcome diagnostic uncertainties? Radiat Oncol. 2016;11(1):139.	Observational study (Prospective)	22	18F-FET uptake was higher in tumor recurrence compared to radiation-induced changes (TBRmax 2.9 vs. 2.0, p < 0.001; TBRmean 2.2 vs. 1.7, p < 0.001). : In patients with MRI-suspected tumor recurrence after focused high dose radiotherapy, 18F-FET PET has a high sensitivity and specificity for the differentiation of vital tumor tissue and radiation-induced lesions.	2
추가2_73	Tomura N, Kokubun M, Saginoya T, Mizuno Y, Kikuchi Y. Differentiation between treatment-induced necrosis and recurrent tumors in patients with metastatic brain tumors: comparison among 11C-methionine-PET, FDG-PET, MR permeability imaging, and MRI-ADC-preliminary results. AJNR Am J Neuroradiol. 2017;38(8):1520–1527.	Observational study (Retrospective)	15	The present study suggests that PET using 11C-methionine may be superior to MR permeability imaging, ADC, and FDG-PET for differentiating radiation necrosis from recurrent tumors after gamma knife radiosurgery for metastatic brain tumors.	2
추가2_84	Heinzel A, Müller D, Yekta-Michael SS, et al. O-(2-18F-fluoroethyl)-L-tyrosine PET for evaluation of brain metastasis recurrence after radiotherapy: an effectiveness and cost-effectiveness analysis. Neuro Oncol. 2017;19(9):1271–1278.	Observational study (Retrospective)	62	The model suggests that the additional use of FET PET with conventional MRI for the diagnosis of recurrent brain metastases may be cost-effective. Integration of FET PET has the potential to avoid overtreatment with corresponding costs as well as unnecessary side effects.	3
추가2_85	Heinzel A, Müller D, Langen KJ, et al. The use of O-(2-18F-fluoroethyl)-Ltyrosine PET for treatment management of bevacizumab and irinotecan in patients with recurrent high-grade glioma: a cost-effectiveness analysis. J Nucl Med. 2013;54(8):1217–1222.	Observational study (Retrospective)	21	The model suggests that the additional use of 18F-FET PET in the management of patients with recurrent high-grade glioma treated with BEV/IR may be cost-effective. Integration of 18F-FET PET has the potential to avoid overtreatment and corresponding costs, as well as unnecessary side effects to the patient.	3
추가2_86	Heinzel A, Stock S, Langen KJ, Müller D. Cost-effectiveness analysis of amino acid PET-guided surgery for supratentorial high-grade gliomas. J Nucl Med. 2012;53(4):552–558.	Observational study (Retrospective)	66	The results of this analysis indicate that amino acid PET may be a cost-effective tool in the therapy planning of surgical resection of supratentorial high-grade gliomas.	3
추가2_87	Heinzel A, Stock S, Langen KJ, Müller D. Cost-effectiveness analysis of FET PET-guided target selection for the diagnosis of gliomas. Eur J Nucl Med Mol Imaging. 2012;39(7):1089–1096.	Observational study (Retrospective)	31	n The model indicates that the use of amino acid PET may be cost-effective in patients with glioma.	3
추가2_92	Lohmann P, Stoffels G, Ceccon G, et al. Radiation injury vs. recurrent brain metastasis: combining textural feature radiomics analysis and standard parameters may increase 18F-FET PET accuracy without dynamic scans. Eur Radiol. 2017;27(7):2916–2927.	Observational study (Retrospective)	47	Diagnostic accuracy increased from 81 % for TBRmean alone to 85 % when combined with the textural parameter Coarseness or Short-zone emphasis. The accuracy of TBRmax alone was 83 % and increased to 85 % after combination with the textural parameters Coarseness, Short-zone emphasis, or Correlation. Analysis of TACs resulted in an accuracy of 70 % for kinetic pattern alone and increased to 83 % when combined with TBRmax	2
추가2_93	Lohmann P, Kocher M, Ceccon G, et al. Combined FET PET/MRI radiomics differentiates radiation injury from recurrent brain metastasis. Neuroimag Clin. 2018;20:537–542.	Observational study (Retrospective)	42	For the differentiation between radiation injury and recurrence of brain metastasis, textural features extracted from CE-MRI had a diagnostic accuracy of 81% (sensitivity, 67%; specificity, 90%). FET PET textural features revealed a slightly higher diagnostic accuracy of 83% (sensitivity, 88%; specificity, 75%). However, the highest diagnostic accuracy was obtained when combining CE-MRI and FET PET features (accuracy, 89%; sensitivity, 85%; specificity, 96%).	2
최신성168	AKHOUNDOVA, Dilara, et al. 18F-FET PET for diagnosis of pseudoprogression of brain metastases in patients with non–small cell lung cancer. Clinical nuclear medicine, 2020, 45.2: 113-117.	Observational study (Retrospective)	53	18F-FET PET correctly identified pseudoprogression in 9 of 11 patients (81.8%). In patients who did not undergo 18F-FET PET, 5 of 19 (26.3%) were diagnosed with pseudoprogression. 18F-FET PET may help differentiate pseudoprogression from real progression in order to avoid discontinuation of effective therapy or unneeded interventions.	2

최신성151	CICONE, Francesco, et al. Long-term metabolic evolution of brain metastases with suspected radiation necrosis following stereotactic radiosurgery: longitudinal assessment by F-DOPA PET. Neuro-oncology, 2021, 23.6: 1024-1034.	Observational study (Prospective)	30	F-DOPA tumor-to-brain ratio (TBR) and relative standardized uptake value (rSUV) increased significantly over time in LP lesions, while remaining stable in RN lesions. The parameter showing the best diagnostic performance was rSUV (accuracy = 94.1% for the optimal threshold of 1.92).	2
최신성171	DE ZWART, Paul L., et al. Diagnostic accuracy of PET tracers for the differentiation of tumor progression from treatment-related changes in high-grade glioma: a systematic review and metaanalysis. Journal of Nuclear Medicine, 2020, 61.4: 498-504.	Systematic Review	771	18F-FET and 11C-MET, both amino-acid tracers, showed a comparably higher sensitivity than 18F-FDG in the differentiation between tumor progression and treatment-related changes in high-grade glioma patients.	2
최신성152	GALLDIKS, Norbert, et al. Treatment monitoring of immunotherapy and targeted therapy using 18F-FET PET in patients with melanoma and lung cancer brain metastases: initial experiences. Journal of Nuclear Medicine, 2021, 62.4: 464-470.	Observational study (Retrospective)	40	A TBR threshold of 1.95 differentiated BM relapse from treatment-related changes with an accuracy of 85% (P = 0.003). Metabolic responders to ICI or TT on 18F-FET PET had a significantly longer stable follow-up (threshold of TBR reduction relative to baseline, $10%; accuracy, 82%; P = 0.004). Furthermore, at follow-up, time to peak in metabolic responders increased significantly (P = 0.019).	2
최신성138	GOVAERTS, Chris W., et al. 11C-methyl-L-methionine PET measuring parameters for the diagnosis of tumour progression against radiation-induced changes in brain metastases. The British Journal of Radiology, 2021, 94.1125: 20210275.	Observational study (Retrospective)	26	All MET-PET parameters except metabolic-tumour-volume showed statistically significant differences between tumour progression and lesions with RIC. Receiver-operating-characteristic curve and area-under the-curve analysis demonstrated the highest value of 0.834 for SUVmax with a corresponding optimum threshold of 3.29. This associated with sensitivity, specificity, positive predictive and negative predictive values of 78.57, 70.59%, 74.32 and 75.25% respectively.	2
최신성139	GROSSE, Frederik, et al. Benefit of static FET PET in pretreated pediatric brain tumor patients with equivocal conventional MRI results. Klinische Pädiatrie, 2021, 233.03: 127-134.	Observational study (Retrospective)	22	Static FET-PET/CT reliably distinguished between tumor tissue and post-therapeutic changes in 16 out of 17 patients. It identified correctly vital tumor tissue in 13 patients and post-therapeutic changes in 3 patients. SUV-based analyses were less sensitive than visual analyses. Except from a choroid plexus carcinoma, all tumor entities showed increased FET-uptake.	2
최신성172	MAURER, Gabriele D., et al. 18F-FET PET imaging in differentiating glioma progression from treatment-related changes: a single-center experience. Journal of nuclear medicine, 2020, 61.4: 505-511.	Observational study (Retrospective)	127	TP was diagnosed in 94 patients (74%) and TRCs in 33 (26%). For differentiating TP from TRCs, receiver-operating-characteristic analysis yielded an optimal 18F-FET TBRmax cutoff of 1.95 (sensitivity, 70%; specificity, 71%; accuracy, 70%; area under the curve, 0.75 ± 0.05). The highest accuracy was achieved by a combination of TBRmax and slope (sensitivity, 86%; specificity, 67%; accuracy, 81%).	2
최신성133	PURANIK, Ameya D., et al. Brain FET PET tumor-to-white mater ratio to differentiate recurrence from post-treatment changes in high-grade gliomas. Journal of Neuroimaging, 2021, 31.6: 1211-1218.	Observational study (Retrospective)	72	Forty-one of 72 patients (57%) showed recurrent disease on FET PET. Thirty-five of them were confirmed to have tumor recurrence; six patients showed post-treatment changes. Thirty-one of 72 patients (43%) showed post-treatment changes on FET PET; 27 were confirmed as post-treatment change and four patients had tumor recurrence on subsequent MR imaging. An optimum T/Wm cutoff of 2.65 was derived based on receiver operating characteristic analysis with a sensitivity of 80% and specificity of 87.5%.	2
최신성156	SOMME, François, et al. Usefulness of 18F-FDOPA PET for the management of primary brain tumors: a systematic review of the literature. Cancer Imaging, 2020, 20.1: 1-13.	Systematic Review		It appears that 18F-FDOPA PET holds promise as an effective additional tool in the management of gliomas. More consistent prospective studies are still needed	2
최신성149	STEIDL, Eike, et al. Sequential implementation of DSC-MR perfusion and dynamic [18F] FET PET allows efficient differentiation of glioma progression from treatment-related changes. European Journal of Nuclear Medicine and Molecular Imaging, 2021, 48.6: 1956-1965.	Observational study (Retrospective)	104	While marked hyperperfusion on PWI (perfusion-weighted MRI) indicated TP(tumor progression), [18F]FET PET proved beneficial to discriminate TP from TRC(treatment-related change) when PWI remained inconclusive. Thus, our results highlight the clinical value of sequential use of PWI and [18F]FET PET, allowing an economical use of diagnostic methods. The impact of an IDH mutation needs further investigation.	2