TABLE 1. Summary of studies with imaging <24 hours to evaluate technical treatment success														
author	local therapy	tumor type	nr of pts	study design	baseline imaging	post-therapy timepoint 1	post-therapy timepoint 2	post-therapy timepoint 3	post-therapy timepoint +	comparator imaging (criterion)	criteria for PET evaluation	clinical endpoint	clinical outcome measure	QUADAS criteria met
Cornelis et al. J Nucl Med 2016	thermal ablation (RFA or microwave)	liver metastases from different primary tumors	n=21	retro-spective	no	immediate	-	-	no	ceCT	visual, tissue radioactivity concentration (TRC)	1-year tumor response	follow-up, ceCT	yes
Vandenbroucke et al. J Vasc Interv Radiol 2014	RFA	liver metastases	n=20	n/a	no	24 hours	-	-	-	ceCT	visual, predefined patterns	tumor response	follow-up, PET/CT	yes
Kuehl et al. Clin Oncol 2008	RFA	liver metastases colorectal and hepatocellular carcinoma	n=55	retro-spective	yes	<24 hours	1 month	3 months	yes	ceCT	SUVmax, visual	local tumor progression	histology, or ceCT and follow-up	yes
Kuehl et al. Eur J Radiol 2008	RFA	liver metastases from colorectal cancer	n=16	pro-spective	yes	<24 hours	4 weeks	3 months	-	PET alone, MR	SUVmax, visual	local tumor progression	histology, or ceCT and follow-up	yes
Ryan et al. Radiology 2013	RFA	liver metastases from different primary tumors	n=23	retro-spective	yes	immediate	-	-	-	no	visual	local tumor progression	most recently available follow-up CT, MR, or PET	yes

TABLE 2. Main results of studies with imaging <48 hours to evaluate technical treatment success					
author	local therapy	tumor type	nr of pts	main results/conclusion	QUADAS criteria met
Cornelis et al. J Nucl Med 2016	thermal ablation (RFA or microwave)	liver metastases from different primary tumors	n=21	11 of the 25 tumors recurred within 1 year. The accuracy of the qualitative analysis of FDG PET was 92% (23/25) (P < 0.001), and the area under the ROC curve was 0.929 (95% CI, 0.740-0.990). Immediate PET/CT accurately predicts the success of liver metastasis ablation at 1 year and is superior to immediate contrast enhanced CT.	yes
Vandenbroucke et al. J Vasc Interv Radiol 2014	RFA	liver metastases	n=20	Nodular enhancement and rim-like enhancement together had the highest sensitivity to detect viable tumor localisation (63% and 48% respectively). Nodular enhancement had the highest specificity.	yes
Kuehl et al. Clin Oncol 2008	RFA	liver metastases colorectal and hepatocellular carcinoma	n=55	35/78 tumors showed local tumor progression (LTP) There was no significant difference in the mean time until the detection of local tumor progression: 4.1 ± 3 months when PET/CT was used and 5.85 ± 4.6 months when using contrast-enhanced computed tomography (P > 0.11). PET/CT supports RFA by early identification of residual tumor or LTP.	yes
Kuehl et al. Eur J Radiol 2008	RFA	liver metastases from colorectal cancer	n=16	The accuracy and sensitivity for tumor detection was 86% and 76% for PET alone, 91% and 83% for PET/CT and 92% and 75% for MRI, respectively. In comparison to PET alone, PET/CT was significantly better for detecting LTP after RFA. There were no significant differences between MRI and PET/CT, but these preliminary results need further verification.	yes
Ryan et al.	RFA	Liver metastases from different primary tumors	n=23	28 (97%) of the ablated lesions showed no residual FDG activity directly after RFA. One patient with residual activity underwent immediate biopsy that revealed residual viable tumor and was immediately re-treated. Follow-up imaging showed local recurrences in two (7%) lesions that were negative at PET immediately after ablation.	yes

TABLE 3. Summary of studies with imaging to evaluate treatment efficacy														
author	local therapy	tumor type	nr of pts	study design	baseline imaging	post-therapy timepoint 1	post-therapy timepoint 2	post-therapy timepoint 3	post-therapy timepoint +	comparator imaging (criterion)	criteria for PET evaluation	clinical endpoint	clinical outcome measure	QUADAS criteria met
indication: RFA and cryoablation in liver metastases														
Joosten et al. Eur J Surg Oncol 2005	RFA and cryo-ablation w/ or w/o resection	liver metastases from colorectal cancer	n=43	retro-spective		<3 weeks	6 weeks	3 months	yes	ceCT	visual		follow-up	yes
Langenhoff et al. J Clin Oncol 2002	RFA and cryo-ablation w/ or w/o resection	liver metastases from colorectal cancer	n=23	pro-spective	yes	<3 weeks	6 weeks	3 months	6 months	ceCT	visual	local recurrence	follow-up and tumor marker	yes
Donckier et al. J Surg Oncol 2003	RFA	liver metastases	n=17	pro-spective	yes	1 week	1 month	3 months	yes	ceCT	visual	local recurrence	follow-up and/or histology	yes
Chen et al. Ann Nucl Med 2013	RFA	primary liver tumor or metastases	n=28	retro-spective	no	<8 weeks	-	-	-	ceCT, MR	visual	local recurrence	follow-up, ceCT, PET, MR	yes
Nielsen et al Eur J Radiol 2013	RFA	liver metastases from colorectal cancer	n=79	retro-spective	Yes	<1 year	-	-	-	ceCT	Visual	local recurrence	ceCT	no
Sahin et al. Ann Surg Oncol 2012	RFA	liver metastases from	n=104	retro-spective	yes	variable (median 12	-	-	-	ceCT	not specified	local recurrence, overall survival	ceCT, follow-up	no

		colorectal cancer				months)								
indication: RFA and cryoablation for lung lesions														
Yoo et al. Am J Roentgenol 2011	RFA	irresectable primary non-small cell lung cancer	n=30		yes	4 days (n=26)	6 months (n=23)	-	no	no	SUVmax	1-year clinical event	follow-up, ceCT	Yes
Lafuente et al. Rev Esp Med Nucl Imagen Mol 2016	RFA	lung metastases colorectal cancer	n=18	pro-spective	yes	1 month	3 months	-	-	no	SUVmax and retention index	local recurrence	histology	No
Deandreis et al. Radiology 2011	RFA	lung carcinoma or lung metastases	n=34	pro-spective	yes	(24 hrs)	1 month	3 months	yes	ceCT	SUVmax, visual	local recurrence	follow-up	Yes
Higuchi et al. J Cancer Res Clin Oncol 2014	RFA	lung carcinoma or lung metastases	n=20	pro-spective	yes	7-14 days	3-6 months	-	-	ceCT (RECIST)	visual	local recurrence, 2-yr OS		Yes
Higaki et al. Ann Nucl Med 2008	RFA	lung carcinoma or lung metastases	n=15	pro-spective	yes	0-3 months	3-6 months	6-9 months	-	ceCT	SUVmax		follow-up	Yes
Alafate et al. Acta Med Okayama 2013	RFA	lung cancer or lung metastases	n=25	retro-spective	Yes	3 months	6 months	-	-	ceCT	SUVmax	tumor response	follow-up	No
Wang et al. Int J Clin Exp Med 2015	RFA	lung metastases from - lung carcinoma	58	pro-spective	Yes	3 months	9 months	12 months	yes	ceCT	SUVmax	local recurrence	follow-up	Yes
Bonichon et al. Eur J Nucl Med Mol	RFA	lung metastases	n=89	pro-spective	Yes	3 months	-	-	-	ceCT	SUVmax	local recurrence	ceCT	yes

Imaging 2013														
Singnurkar et al. J Nucl Med 2010	RFA	lung carcinoma or lung metastases	n=68 (56 adequate imaging)	retro-spective	Yes	1-4 months	6-12 months	-	-	ceCT	SUVmax, visual	local recurrence	follow-up	No
Suzawa et al. Clin Nucl Med 2013	RFA	lung carcinoma or lung metastases	n=143	retro-spective	No	3 months	6 months	9 months	yes	ceCT	SUVmax	local recurrence	follow-up, histology	Yes
LoGiurato et al. Nucl Med Commun 2015	cryoablation	non-small cell lung cancer	n=28	retro-spective	yes (n=19 lesions)	6 months (n=23) or 12 months (n=4)	12 months	18 months	24 months	CT	SUVmax	local recurrence	PET/CT and CT	Yes
indication: regional ablative therapy in hepatocellular carcinoma														
Higashi et al. Eur J Nucl Med Mol Imaging 2010	TACE, TAC, RFA or systemic chemo-therapy	hepato-cellular carcinoma	n=60 -	retro-spective	yes	<1 month	-	-	-	no	SUVmax, visual		follow-up, tumor markers	No
Sabet et al. Nuklearmedizin 2014	Y-90 microspheres	hepato-cellular carcinoma	n=33	retro-spective	yes	4 weeks	-	-	-	no	SUVmax	overall survival	follow-up	Yes
Ma et al. Theranostics 2014	TACE	hepato-cellular carcinoma	n=27	retro-spective	Yes	4-6 weeks	-	-	-	ceCT (mRECIST)	SUVmax	overall survival , time to progression	follow-up, ceCT	Yes
Kim et al. Nucl Med Mol Imaging 2012	RFA, TACE or ethanol injection	hepato-cellular carcinoma	n=31	retro-spective	no	<1 month	-	-	-	no	SUVmax, visual	local recurrence	follow-up with ceCT and tumor marker	No
Paudyal et al.	RFA	hepato-	n=24	pro-	yes	3 months	6	9 months	yes	ceCT	SUVm	local	follow-	yes

Oncol Rep 2007		cellular carcinoma		spective			months				ax	recurrence	up	
Li et al. Eur J Nucl Med Mol Imaging 2017	TACE (+/- bevacizumab)	hepato-cellular carcinoma	n=22	pro-spective	yes	10 weeks				11C-Acetate PET, CT (RECIST)	Metabolic response	overall survival	follow-up	Yes
Cascales-Campo et al. Transplant Proc 2015	TACE	hepato-cellular carcinoma undergoing orthotopic liver transplantation	n=20	retro-spective	yes	Variable interval after TACE (<8 weeks before liver transplant)	-	-	-	No	SUVmax	tumor response, survival rate 1-year and 3-year	histology, follow-up	No
Song et al. Clin Radiol 2015	TACE	hepato-cellular carcinoma	n=73	retro-spective	no	variable (mean 41 days)	-	-	-	ceCT	ratio SUVmax tumor to SUVmean liver	treatment success, overall survival	follow-up, ceCT, tumor marker	No
Wang et al. J Dig Dis 2013	status after surgery and/or RFA	recurrence of hepato-cellular carcinoma	n=36	pro-spective	no	varying <2-3 months	-	-	-	ceUS	visual	local recurrence	biomarker, histology, follow-up	Yes
indication: radioembolisation in liver metastases														
Miller et al. Am J Roentgenol 2007	Y-90 microspheres	liver metastases from different primary tumors	n=23	retro-spective	yes	<30 days	60 days	90 days	yes	CT (WHO, RECIST, necrosis)	visual	tumor respons	follow-up	Yes

Gulec et al. Eur J Nucl Med Mol Imaging 2011	Y-90 resin microspheres	liver metastases from colorectal cancer	n=20	pro-spective	yes	4 weeks	-	-	-	no	functional tumor volume, TLG	overall survival	follow-up	Yes
Sabet et al. Eur J Nucl Med Mol Imaging 2015	Y-90 microspheres	liver dominant metastatic colorectal cancer	n=51	retro-spective	yes	4 weeks	-	-	-	no	SUVmax, ratio SUVmax to liver (>50% decrease)	overall survival	follow-up	Yes
Kalva et al. Am J Clin Oncol 2017	Y-90 micro-spheres	liver metastases from colorectal cancer	n=45	retro-spective	yes	45 days (n=35)	6 months	9 months	yes	ceCT and/or MR (RECIST)	PERCIST	overall survival	follow-up	No
Fendler et al. J Nucl Med 2013	Y-90 micro-spheres	liver metastases from colorectal cancer	n=80	pro-spective	yes	3 months	-	-	-	ceCT (RECIST 1.1)	MTV, TLG, SUVmax, SUVpeak	overall survival	follow-up	Yes
Fendler et al. J Nucl Med 2016	Y-90 micro-pheres	liver metastases from breast cancer	n=81	retro-spective	yes	3 months	6 months (n=30)	9 months (n=30)	yes	no	SUVmax (>30% decrease)	treatment response, overall survival	follow-up, tumor marker	Yes
Haug et al. J Nucl Med 2012	Y-90 micro-spheres	liver metastases from breast cancer	n=58		yes	3 months	-	-	-	ceCT and MR (RECIST)	SUVmax (PERCIST)	overall survival	follow-up	No
Michl et al. J Nucl Med 2016	Y-90 micro-spheres	liver metastases from	n=17	retro-spective	yes	3 months	-	-	-	ceCT (RECIST)	SUVpeak, TLG	overall survival, progression	follow-up, ceCT/M	yes

		pancreatic cancer									(PERCIST)	free survival, intrahepatic progression	R, tumor markers	
Sofocleous et al. Clin Colorectal Cancer 2014	Y-90 micro-spheres	liver metastases from colorectal cancer	n=19	pro-spective	yes, in 15/19 patients	4-8 weeks	3-4 months	5-6 months	yes	ceCT (RECIST)	PERCIST	liver-PFS, PFS, OS	follow-up, ceCT or MR, and tumor markers	Yes
Sofocleous et al. Clin Colorectal Cancer 2015	Y-90 micro-spheres	liver metastases from colorectal cancer	n=53	retro-spective	yes	4-8 weeks	12-16 weeks	-	-	ceCT (RECIST)	SUVmax (PERCIST)	tumor response	follow-up	No
Szyszko et al. Nucl Med Commun 2007	Y-90 micro-spheres	liver metastases different primary tumors	n=21	pro-spective	yes	6 weeks	6 months	12 months	-	ceCT (RECIST)	SUVmax	tumor response	follow-up, ceCT	Yes
Zerizer et al. Eur J Nucl Med Mol Imaging 2012	Y-90 micro-spheres	liver metastases from colorectal cancer	n=25	pro-spective	yes	6-8 weeks	-	-	-	ceCT (RECIST, Choi)	EORTC criteria	2-year PFS (excluding extrahepatic progression)	follow-up, tumor markers	Yes
Bagni et al. Cancer Biother Radiopharm 2015	Y-90 micro-spheres	liver metastases from breast cancer	n=17	pro-spective	yes	6 weeks	-	-	no	no	TLG (>50% decrease)	overall survival	follow-up	Yes
Barabasch et al. Invest Radiol 2015	Y-90 microspheres	liver metastases from different primary tumors	n=35	pro-spective	yes	6 weeks (n=31)	-	-	-	MRI (ADCmin)	SUVmax (>30% decrease)	tumor response	follow-up, MRI	Yes
Kucuk et al. Worl J Surg	Y-90 micro-spheres	liver metastases	n=78	retro-spective	yes	6 weeks	12 week	18 weeks	yes	no	SUVmax	treatment response	follow-up	yes

Oncol 2011		from different primary tumors					s				(>20% decrease)			
Willowson et al. EJNMMI res 2017	Y-90 micro-spheres	liver metastases from colorectal cancer	n=22	retrospective	yes	<8 weeks	-	-	-	no	delta-TLG (50% decrease) SUVpeak	overall survival	follow-up	Yes
Edalat et al. Clin Nucl Med 2016	Y-90 micro-spheres	liver metastases colorectal cancer	n=16	retro-spective	yes	0.9-5.7 months	n/a	n/a	n/a	ceCT and/or MR	PERCIST, TLG, SUVpeak, SAM	overall survival	follow-up	No
Shady et al. Eur J Rad 2016	Y-90 microspheres	liver metastases from colorectal cancer	n=49	retro-spective	yes	3-11 weeks (median 6 weeks)					SUVmax, SUVpeak, MTP and TLG	overall survival	follow-up	yes
Shady et al. AJR 2016	Y-90 microspheres	liver metastases from colorectal cancer	n=25	retro-spective	yes	4-8 weeks	every 2 months until progression			ceCT (RECIST, Choi)	EORTC criteria	liver progression free survival	follow-up	yes
indication: radioembolisation for cholangiocellular carcinoma														
Haug et al. Eur J Nucl Med Mol Imaging 2011	Y-90 micro-spheres	intrahepatic cholangio-cellular carcinoma	n=26	pro-spective	Yes	3 months	-	-	-	no	delta-SUVmax, delta-	overall survival	follow-up	Yes

											SUVmean, deltaMTV			
Filippi et al. Nucl Med Biol 2015	Y-90 micro-spheres	intrahepatic cholangio-cellular carcinoma	n=17	pro-spective	Yes	6 weeks	3 months	6 months	9 months	no	detla-TLG (PERCIST)		follow-up	Yes

TABLE 4. Main results of studies with imaging at early and late time points to evaluate treatment efficacy					
Author	local therapy	tumor type	nr of pts	Main results/ conclusion	QUADAS criteria met
indication: RFA and cryoablation in liver metastases					
Joosten et al. Eur J Surg Oncol 2005	RFA and cryo-ablation w/ or w/o resection	liver metastases from colorectal cancer	n=43	In a subgroup analysis on 43 patients with 104 ablated lesions, CT scan immediate after treatment was not able to predict local treatment failure, whereas FDG-PET scan within 3 weeks after local ablative treatment predicted 6/7 local recurrences.	yes
Langenhoff et al. J Clin Oncol 2002	RFA and cryo-ablation w/ or w/o resection	liver metastases from colorectal cancer	n=23	51 lesions became photopenic on FDG-PET, while 5 lesions showed persistent activity on FDG-PET. In 4/5 FDG-PET-positive lesions, a local recurrence developed during follow-up; one FDG-PET-positive lesion turned out to be an abscess. None of the FDG-PET-negative lesions developed a local recurrence during follow-up. FDG-PET showed all 9 cases with extra-hepatic recurrence. Detection of recurrence by FDG-PET was considerably earlier than the detection by CT.	yes
Donckier et al. J Surg Oncol 2003	RFA	liver metastases	n=17	In four patients, FDG-PET at 1 week and 1 month showed peripheral hypermetabolic residue after RFA, whereas CT did not revealed residual tumor. In three patients, local persistence of viable tumor cells was biopsy-proven at reintervention. In the fourth, follow-up CT showed subsequent development of a local recurrence. FDG-PET accurately monitors the local efficacy of RFA for treatment of liver metastases, as it early recognizes incomplete tumor ablation, not detectable on CT	yes
Chen et al. Ann Nucl Med 2013	RFA	primary liver tumor or metastases	n=28	PET identified 16 out of 17 recurrent/residual tumors with a sensitivity of 94.1 %, specificity 81.3%. Sensitivity of CT and MRI 66.7%, specificity 62,5 and 87,5% respectively. The study suggests that FDG-PET is superior to MRI and/or CT and is more cost-effective in post RFA hepatic tumor assessment.	yes
Nielsen et al Eur J Radiol 2013	RFA	liver metastases from colorectal cancer	n=79	Regular follow-up using FDG PET-CT within this period is advised, so repeated treatment can be initiated. Rim-shaped uptake may be present until 4-6 months, complicating evaluation. The benefit in the follow-up of lesions <2 cm may be limited.	no
Sahin et al. Ann Surg Oncol 2012	RFA	liver metastases from colorectal cancer	n=104	PET/CT findings were equivalent to ce CT in 55 patients (67%), superior in 22 (27%), and inferior in 5 (6%). Pre-RFA or post-RFA PET imaging did not affect overall survival. PET/CT was superior to ce CT in demonstrating recurrence after RFA in about a quarter of the patients with CLM.	no

indication: RFA and cryoablation for lung lesions					
Yoo et al. Am J Roentgenol 2011	RFA	irresectable primary non-small cell lung cancer	n=30	Patients with a complete metabolic response at early PET/CT had a 1-year event rate of 43%, whereas those with partial or no response or disease progression had a 1-year event rate of 67% (p = 0.27). Patients with a complete metabolic response at 6-month PET/CT had a 1-year event rate of 0%. Those with a partial response and those with disease progression had an overall event rate of 75% (p = 0.001) Early post-RFA PET/CT is not necessary and 6-month post-RFA PET/CT findings correlate better with clinical outcome at 1 year.	yes
Lafuente et al. Rev Esp Med Nucl Imagen Mol 2016	RFA	lung metastases colorectal cancer	n=18	The retention index (dual time point PET) at 1 month after RFA showed a sensitivity and specificity of 83% and 92%, respectively. Dual time point PET/CT can predict the outcome at one month after RFA in lung metastases from digestive tract cancers. The retention index can be used to indicate the need for further procedures to rule out persistent tumor due to incomplete RFA.	no
Deandreis et al. Radiology 2011	RFA	lung carcinoma or lung metastases	n=34	Within 3 months after RF ablation, incomplete treatment was diagnosed in four of 28 patients (14%, three at 1 month and one at 3 months). Findings of FDG PET/CT were true positive in four, false positive in one, and true negative in 23 patients. Findings of chest CT were true positive in one, false positive in one, false negative in three, and true negative in 23 patients.	yes
Higuchi et al. J Cancer Res Clin Oncol 2014	RFA	lung carcinoma or lung metastases	n=20	The FDG-PET results 7-14 days after RFA did not predict recurrence, whereas positive findings 3-6 months after RFA significantly correlated with local recurrence (p = 0.0016) We confirmed the effectiveness of RFA for unresectable primary and secondary thoracic malignancies. FDG-PET analysis 3-6 months after ablation is a useful tool to assess local control.	yes
Higaki et al. Ann Nucl Med 2008	RFA	lung carcinoma or lung metastases	n=15	Of 60 tumors, 10 showed local progression. The area under the ROC curve (AUC) for the 6-9 months (P = 0.044) was the largest and almost equal to that of the 3-6 months (P = 0.024). AUC for the 0-3 months was the smallest and statistically insignificant (P = 0.705). The cutoff value of 1.5 of SUVmax at 3-9 months after RFA showed 77.8% sensitivity and 85.7-90.5% specificity. The appropriate follow-up initiation time point is at least 3 months following RFA.	yes
Alafate et al. Acta Med Okayama 2013	RFA	lung cancer or lung metastases	n=25	SUVmax was more reliable than the size measurements by CT in the first 6 months after RFA, and PET/CT at 6 months post-RFA may be more appropriate for the assessment of FDG accumulation than that at 3 months post-RFA.	no
Wang et al. Int J Clin Exp Med 2015	RFA	lung metastases from - lung carcinoma	n=58	Increased metabolic activity, new uptake of FDG, and irregular or nodular high uptake of FDG (maximum standard uptake value (SUVmax) ≥3) of the ablated zone after 3 months were all findings concerning recurrence or residual.	yes
Bonichon et al. Eur J Nucl	RFA	lung metastases	n=89	PET/CT at 3 months and the reference standard were available in 77 patients and 100 lesions. Accuracy was 66.00% (95% CI 55.85-75.18%), sensitivity 90.91% (95 % CI 58.72-99.77 %),	yes

Med Mol Imaging 2013				specificity 62.92% (95% CI 52.03-72.93%), PPV 23.26% (95% CI 11.76-38.63%), and NPV 98.25% (95% CI 90.61-99.96%). The specificity of PET/CT at 3 months is low. It is useful for its negative predictive value, but positive findings need to be confirmed.	
Singnurkar et al. J Nucl Med 2010	RFA	lung carcinoma or lung metastases	n=68 (56 adequate imaging)	Post-RFA factors that related to reduced recurrence-free survival included an unfavorable uptake pattern ($P < 0.01$), post-RFA SUV ($P < 0.01$), and an increase in SUV over time after ablation ($P = 0.05$).	no
Suzawa et al. Clin Nucl Med 2013	RFA	lung carcinoma or lung metastases	n=143	The area under the ROC curve of PET was higher than that of CT at all 4 time points (0.71 vs 0.55 at 3 months, 0.82 vs 0.60 at 6 months, 0.84 vs 0.66 at 9 months, and 0.92 vs 0.68 at 12 months), and its diagnostic performance was significant at each time point ($P = 0.0010$ at 3 months and $P < 0.001$ at 6, 9, and 12 months). FDG PET/CT is better able to assess local tumor progression at 3 and 6 months after lung RFA than CT alone.	yes
LoGiurato et al. Nucl Med Commun 2015	cryoablation	non-small cell lung cancer	n=28	FDG PET-CT is a valuable tool for determining treatment response and for distinguishing benign from malignant lesions after cryoablation. The CT area was most predictive of future recurrence at baseline, whereas SUVmax more than or equal to 2.5 was most predictive of future recurrence at first follow-up.	yes
indication: regional ablative therapy in hepatocellular carcinoma					
Higashi et al. Eur J Nucl Med Mol Imaging 2010	TACE, TAC, RFA or systemic chemo-therapy	hepato-cellular carcinoma	n=60	Visual PET diagnosis of post-therapeutic lesions was a good predictor of overall survival of unresectable HCC patients. The low FDG group showed significantly longer survival (average: 608 days) than that (average: 328 days) of the high FDG group ($p < 0.0001$).	no
Sabet et al. Nuklearmedizin 2014	Y-90 microspheres	hepato-cellular carcinoma	n=33	FDG-negative patients had a significantly longer OS (13 months, 95%CI 7-19) than FDG-positive patients (9 months, 95%CI 7-11; $p = 0.010$). Among FDG-positive patients, metabolic responders survived significantly longer than metabolic non-responders (10 months, 95%CI 8-12 vs. 5 months, 95%CI 4-6; $p = 0.003$). Pre- and post-therapeutic FDG PET independently predicts overall survival in patients with HCC undergoing radioembolization.	yes
Ma et al. Theranostics 2014	TACE	hepato-cellular carcinoma	n=27	The ΔTSUVmax%, based on the VOI, had the highest discriminative prognostic value.The OS was significantly better in the PET/CT response group than in the PET/CT non-response group ($p=0.025$).	yes
Kim et al. Nucl Med	RFA, TACE or ethanol injection	hepato-cellular	n=31	By visual analysis, the respective values for sensitivity, specificity, positive predictive value, negative predictive value, and accuracy were 87.5, 71.4, 77.8, 83.3, and 80.0 %. However, there	no

Mol Imaging 2012		carcinoma		were no significant differences in the SUVmax and TNR between the two groups.	
Paudyal et al. Oncol Rep 2007	RFA	hepato-cellular carcinoma	n=24	FDG PET detected recurrence earlier than CT between 4-6 months in 2 patients and between 7-9 months in 6 patients whereas CT was positive in 4 patients. Overall detection rate of recurrence with FDG PET was 92% which was higher than that of CT (75%).	yes
Li et al. Eur J Nucl Med Mol Imaging 2017	TACE (+/- bevacizumab)	hepato-cellular carcinoma	n=22	In patients treated with TACE and placebo, there was a significant difference in mean OS in patients with positive FDG PET as compared with that in patients with negative FDG PET (p = 0.048). Although the OS days in patients with positive acetate PET were shorter as compared with those in patients with negative acetate PET, there was no statistically significant difference (p = 0.063).	yes
Cascales-Campo et al. Transplant Proc 2015	TACE	hepato-cellular carcinoma undergoing orthotopic liver transplantation	n=20	Among patients whose post-TACE SUV decreased to <3, >70% necrosis was observed upon study of a hepatectomy sample, with a survival rate of 100% and 80% at 1 and 3 years, respectively.	no
Song et al. Clin Radiol 2015	TACE	hepato-cellular carcinoma	n=73	Comparing the receiver-operating characteristic area, (18)F-FDG-PET/CT was found to be superior to CECT for the detection of viable tumour in patients with HCC after TACE (p = 0.04). The overall survival rate was significantly higher in the low SUV ratio (TSUVmax/LSUVmean<1.65) group (p = 0.024).	no
Wang et al. J Dig Dis 2013	status after surgery and/or RFA	recurrence of hepato-cellular carcinoma	n=36	The sensitivity, specificity of (18) F-FDG-PET/CT for intrahepatic HCC recurrence were 96.7% and 83.3%, respectively. The corresponding values of CEUS were 56.7% and 100%, respectively. The sensitivity and accuracy of (18) F-FDG-PET/CT for the diagnosis of HCC recurrence were significantly higher than those of CEUS (P < 0.01).	yes
indication: radioembolisation in liver metastases					
Miller et al. Am J Roentgenol 2007	Y-90 micro-spheres	liver metastases from different primary tumors	n=23	PET detected significantly more responses to treatment (21/33, 63%) than CT using RECIST (2/33, 6%) or combined criteria (8/33, 24%) (p < 0.05, McNemar test). The use of necrosis and size criteria on CT and corrlation with PET may improve the accuracy of assessment of response to 90Y treatment in patients with liver metastases and detect response earlier than standard size criteria.	yes
Gulec et al. Eur J Nucl Med Mol	Y-90 resin microspheres	liver metastases from	n=20	Pretreatment and posttreatment FTV and TLG showed very strong association with survival. These values can be useful quantitative criteria for patient selection and disease prognostication when (90)Y SIRT is contemplated in patients with CRCLM.	yes

Imaging 2011		colorectal cancer			
Sabet et al. Eur J Nucl Med Mol Imaging 2015	Y-90 micro-spheres	liver dominant metastatic colorectal cancer	n=51	The median OS after RE was 7 months [95 % confidence interval (CI) 5-8]; early metabolic responders (n = 33) survived longer than non-responders (p < 0.001) with a median OS of 10 months (95 % CI 3-16) versus 4 months (95 % CI 2-6). Molecular response assessment in CRC using (18)F-FDG PET/CT appears feasible as early as 4 weeks post-RE.	yes
Kalva et al. Am J Clin Oncol 2017	Y-90 micro-spheres	liver metastases from colorectal cancer	n=45	Per RECIST, 1 patient (2%) had partial response, 34 (71%) had stable disease, and 6 (13%) had progressive disease. PET response was seen in 46% of patients with 2 patients (4%) demonstrating complete and 22 (42%) demonstrating partial metabolic response. The median survival was 186 days (95% CI, 149-277 d). Response on PET was the only independent predictor of superior overall survival.	no
Fendler et al. J Nucl Med 2013	Y-90 micro-spheres	liver metastases from colorectal cancer	n=80	Responders who had a change in metabolic volume or total lesion glycolysis had significantly longer survival (92 vs. 49 wk [P = 0.006] and 91 vs. 48 wk [P = 0.025], respectively). However, neither RECIST 1.1 criteria nor changes in SUV(peak) or SUV(max) after treatment predicted outcome (P = 0.086 for RECIST; P = 0.310 for change in SUV(peak); P = 0.155 for change in SUV(max)).	yes
Fendler et al. J Nucl Med 2016	Y-90 micro-spheres	liver metastases from breast cancer	n=81	Twenty-nine of 56 (52%) patients responded to radioembolization based on FDG PET criteria.	yes
Haug et al. J Nucl Med 2012	Y-90 micro-spheres	liver metastases from breast cancer	n=58	Response as assessed with SUV(max) correlated significantly with survival after radioembolization, with responders having significantly longer survival (65 wk) than nonresponders (43 wk; P < 0.05' The change in SUV(max) as assessed by (18)F-FDG PET/CT before and 3 mo after SIRT was identified as the only independent predictor of survival in patients with hepatic metastases of breast cancer.	no
Michl et al. J Nucl Med 2016	Y-90 micro-spheres	liver metastases from pancreatic cancer	n=17	Metabolic response by change in SUVpeak (7/17) and change in total-lesion glycolysis (7/17) was a predictor for overall survival (P = 0.039; hazard ratio [HR], 0.24; 95% confidence interval [CI], 0.06-0.93), progression-free survival (P = 0.016; HR, 0.15; 95% CI, 0.03-0.69), and time to intrahepatic progression (P = 0.010; HR, 0.16; 95% CI, 0.04-0.65). Summed CT diameter did not predict overall or progression free survival.	yes
Sofocleous et al. Clin Colorectal Cancer 2014	Y-90 micro-spheres	liver metastases from colorectal cancer	n=19	Responses by RECIST, PERCIST, and CEA were, respectively, 0%, 20%, and 32% at 4 to 8 weeks and 5%, 33%, and 21% at 3 to 4 months post SIRT; 53% of patients had stable disease (by RECIST) at 3 to 4 months.	yes

Sofocleous et al. Clin Colorectal Cancer 2015	Y-90 micro-spheres	liver metastases from colorectal cancer	n=53	Evaluation using PERCIST was more likely than RECIST to document response or progression compared with the baseline assessment before RE.	no
Szyszko et al. Nucl Med Commun 2007	Y-90 micro-spheres	liver metastases different primary tumors	n=21	FDG PET imaging is more sensitive than CT in the assessment of early response to SIR spheres, allowing clinicians to proceed with further therapeutic options.	yes
Zerizer et al. Eur J Nucl Med Mol Imaging 2012	Y-90 micro-spheres	liver metastases from colorectal cancer	n=25	The responses on the FDG PET/CT studies were highly correlated with the responses of tumor markers. The responses on (18)F-FDG PET/CT studies also significantly predicted PFS, while RECIST and tumor density did not.	yes
Bagni et al. Cancer Biother Radiopharm 2015	Y-90 micro-spheres	liver metastases from breast cancer	n=17	Subjects with a ΔTLG >50% and ΔTLG <50% had a mean OS of 16.4 ± 0.6 and 10.3 ± 0.4 months, respectively ($p < 0.001$). Cox regression analysis demonstrated hepatic tumor load ($p = 0.048$) and ΔTLG as the only significant ($p = 0.005$) predictors of survival.	yes
Barabasch et al. Invest Radiol 2015	Y-90 micro-spheres	liver metastases from different primary tumors	n=35	Diffusion-weighted magnetic resonance imaging appears superior to PET/CT for early response assessment in patients with hepatic metastases of common solid tumors.	yes
Kucuk et al. Worl J Surg Oncol 2011	Y-90 micro-spheres	liver metastases from different primary tumors	n=78	In the evaluation of treatment response; 43(55%) patients were responder (R) and 35 (45%) patients were non-responder (NR) in the sixth week F18-FDG PET/CT. FDG PET/CT is seen to be a successful imaging method in evaluating treatment response for predicting survival times in this patient group.	yes
Willowson et al. EJNMMI res 2017	Y-90 micro-spheres	Liver metastases from colorectal cancer	n=22	Early reduction in TLG at follow-up may be prognostic for overall survival.	yes

Edalat et al. Clin Nucl Med 2016	Y-90 micro-spheres	liver metastases colorectal cancer	n=16	After Y-90 microspheres, ΔSAM showed an objective response rate of 40%. Median overall survival (OS) of the cohort after Y was 9.2 months (CI 95% 2.2-16.2). Patients demonstrating objective response based on ΔSAM had a median OS of 22.7 months (CI 95% 12.4-33.0) vs. 6.7 (CI 95% 4.2-9.2) in non-responders (P = 0.007).	no
Shady et al. Eur J Rad 2016	Y-90 micro-spheres	Liver metastases from colorectal cancer	n=49	Metabolic response based on changes in MTV and TLG can predict OS post-radioembolisation of colorectal liver metastases.	yes
Shady et al. AJR 2016	Y-90 micro-spheres	Liver metastases from colorectal cancer	n=25	EORTC PET criteria, Choi criteria, and tumor attenuation criteria appear to be equally reliable surrogate imaging biomarkers of liver PFS after radioembolisation in patients with liver metastases from colorectal cancer.	yes
indication: radioembolisation in cholangiocellular carcinoma					
Haug et al. Eur J Nucl Med Mol Imaging 2011	Y-90 micro-spheres	intrahepatic cholangio-cellular carcinoma	n=26	The change in all FDG values significantly predicted survival by Kaplan-Meier analysis after radioembolisation.	yes
Filippi et al. Nucl Med Biol 2015	Y-90 micro-sheres	intrahepatic cholangio-cellular carcinoma	n=17	A decrease in total lesion glycolysis (TLG) of >50% within 6 weeks after treatment is significantly associated with both longer time-to-progression (36.9 versus 13.7 weeks) as well as improved overall survival (79.6 versus 43.1 weeks)	yes

TABLE 5. Evaluation of included studies according to QUADAS criteria

	Risk of bias				**Applicability concerns**			
	Patient selection	Index test	Reference standard	Flow and timing	Patient selection	Index test	Reference standard	criteria met
studies with imaging <48 hours to evaluate technical treatment success								
Cornelis et al. J Nucl Med 2016					<25 patients, different primary tumors			yes
VandenBroucke et al. J Vasc Interv Radiol 2014				Short follow-up (8-10 weeks)	<25 patients			yes
Kuehl et al. Clin Oncol 2008				Not all patients received a PET-CT shortly after treatment				yes
Kuehl et al. Eur J Radiol 2008					<25 patients			yes
Ryan et al. Radiology 2013					<25 patients, different primary tumors			yes
indication: RFA and cryoablation in liver metastases								
Joosten et al. Eur J Surg Oncol 2005	43/58 of patients had a PET							yes
Langenhoff et al. J Clin Oncol 2002					<25 patients			yes
Donckier et al. J Surg Oncol 2003					<25 patients			yes
Chen et al. Ann Nucl Med 2013				Wide range of imaging time points (<8 weeks)				yes
Nielsen et al. Eur J Radiol 2013			Follow-up not specified	Wide range of imaging time points				no
Sahin et al.					compares			no

Ann Surg Oncol 2012					survival with and without PET			
indication: RFA for lung lesions								
Yoo et al. Am J Roentgenol 2011				Long interval (6 months) after intervention				yes
LaFuente et al. Rev Esp Med Nucl Imagen Mol 2016			Unclear how local recurrence was objected		<25 patients			no
Deandreis et al. Radiology 2011								yes
Higuchi et al. J Cancer Res Clin Oncol 2014					<25 patients			yes
Higaki et al. Ann Nucl Med 2008				Wide range of imaging time points (1-3 months, 3-6 months and 6-9 months)	<25 patients			yes
Alafate et al. Acta Med Okayama 2013					<25 patients, exclusion of patients with local recurrence or adjuvant chemotherapy			no
Wang et al. Int J Clin Exp Med 2015								yes
Bonichon et al. Eur J Nucl Med Mol Imaging 2013								yes
Singnurkar et al. J Nucl Med 2010	12/68 patients inadequate follow-up			Wide range of imaging time points (1-4 months)				no

Suzawa et al. Clin Nucl Med 2013		Unclear if reviewers were blinded for outcome						yes
LoGiurato et al. 2015		Cut-off value was not predefined						yes
indication: regional ablative therapy in hepatocellular carcinoma								
Higashi et al. Eur J Nucl Med Mol Imaging 2010					Various interventions and some patients received systemic treatment			no
Sabet et al. Nuklearmedizin 2014								
Ma et al. 2014		Many parameters tested in a small sample size						yes
Kim et al. Nucl Med Mol Imaging 2012				Short follow-up (6 months)	Small population with various interventions			no
Paudyal et al. Oncol Rep 2007					<25 patients			yes
Li et al. Eur J Nucl Med Mol Imaging 2017					<25 patients			yes
Cascales-Campos et al. Transplant Proc 2015				Time point after intervention not specified. <8 weeks before liver transplantation	<25 patients			no
Song et al. Clin Radiol 2015		Cut-off value was not predefined		Wide range of imaging time points				no
Wang et al. J Dig Dis 2013					Follow-up with PET on			yes

					indication			
indication: radioembolisation in liver metastases								
Miller et al. 2007				Short follow-up (mean 101 days)				yes
Gulec et al. Eur J Nucl Med Mol Imaging 2011					<25 patients, Response evaluation not primary research goal			yes
Sabet et al. Eur J Nucl Med Mol Imaging 2015								yes
Kalva et al. Am J Clin		Cut-off value was not predefined			Response evaluation not primary research goal			no
Fendler et al. J Nucl Med 2013								yes
Fendler et al. J Nucl Med 2016								yes
Michl et al. J Nucl Med 2016					<25 patients			
Haug et al. J Nucl Med 2012	43/58 of patients had a PET-CT			Long (3 months) interval between intervention and imaging				no
Sofocleous et al. Clin colorectal cancer 2014	Small group of patients, divided in 3 cohorts				<25 patients			yes
Sofocleous et al. Clin colorectal cancer 2015				64% had additional therapies during follow-up/response evaluation				no
Szysko et al. Nuc Med Comm 2007				Only 14/21 patients had a PET-CT after 6 weeks	<25 patients			yes
Zerizer et al.								yes

Eur J Nucl Med Mol Imaging 2012								
Bagni et al. Cancer Biother Radiopharm 2015				Range of imaging time points < 6 weeks	<25 patients			yes
Barabasch et al. Invest Radiol 2015								yes
Kucuk et al. World J Surg Oncol 2011				Different primary tumors				yes
Willowson et al. EJNMMI res 2017					<25 patients			yes
Edalat et al. Clin Nucl Med 2016				Interval between intervention and PET not specified	<25 patients			no
Shady et al. AJR 2016					<25 patients, different primary tumors			yes
Shady et al. Eur J Rad 2016				Wide range of imaging time point (between 3-11 weeks)				yes
indication: radioembolisation in cholangiocellular carcinoma								
Haug et al. Eur J Nucl Med Mol Imaging 2011								yes
Filippi et al. Nuc Med Biol 2015					<25 patients			yes

Studies with no or one minor comment (indicated in orange) are discussed in the text.