

**Table S1** Univariate and multivariate analyses of the factors associated with 300-day MPE recurrence for 148 EGFR-mutant treatment-naïve NSCLC patients with MPE at diagnosis

Parameters	Univariate Cox regression		Multivariate Cox regression	
	HR (95% CI)	P value	HR (95% CI)	P value
Age	1.00 (0.98–1.02)	0.925	1.20 (0.45–3.20)	0.984
Gender (female)	0.77 (0.46–1.29)	0.319	0.64 (0.37–1.12)	0.117
ECOG PS $\geq$ 2	1.34 (0.88–2.03)	0.173	1.19 (0.76–1.87)	0.450
Liver metastases	1.61 (0.73–3.55)	0.238	1.51 (0.58–3.92)	0.395
Bone metastases	1.33 (0.79–2.24)	0.278	1.44 (0.78–2.66)	0.242
Contralateral lung metastases	0.84 (0.41–1.71)	0.637	0.83 (0.39–1.80)	0.644
Brain metastases	1.05 (0.53–2.07)	0.888	0.95 (0.44–2.04)	0.893
Adrenal gland metastases	1.15 (0.41–3.16)	0.793	0.99 (0.34–2.88)	0.986
Combined systemic treatment within 30 days				
With chemotherapy	0.25 (0.09–0.69)	0.007	0.21 (0.07–0.62)	0.005
With antiangiogenic therapy	0.95 (0.23–3.90)	0.943	1.73 (0.38–7.87)	0.475
MPE control measurements within 30 days				
Indwelling pleural catheter	1.05 (0.48–2.31)	0.893	1.20 (0.45–3.20)	0.712
Intrapleural perfusion	1.15 (0.67–1.96)	0.613	0.98 (0.56–1.72)	0.952
EGFR-activating mutations				
Exon 19 deletion	Ref.		Ref.	
Exon 21 mutation	1.09 (0.64–1.86)	0.743	1.08 (0.60–1.95)	0.804
Unknown	1.40 (0.49–3.98)	0.530	1.15 (0.35–3.77)	0.812
Generation of TKI				
First-generation	Ref.		Ref.	
Second-generation	0.90 (0.32–2.51)	0.842	1.10 (0.36–3.37)	0.870
Third-generation	0.71 (0.38–1.35)	0.302	0.84 (0.41–1.70)	0.623

MPE, malignant pleural effusion; EGFR, epidermal growth factor receptor; NSCLC, non-small cell lung cancer; ECOG PS, Eastern Cooperative Oncology Group performance status; TKI, tyrosine kinase inhibitor; HR, hazard ratio; CI, confidence interval; Ref., reference.

**Table S2** The RSF model and Cox regression model for predicting recurrence-free survival

Time of prediction	Models	tAUC (95% CI)	P value <sup>†</sup>
100 days	RSF model	81.49 (72.09–90.88)	Reference
	Cox model	81.18 (71.73–90.63)	0.881
300 days	RSF model	83.03 (73.43–92.63)	Reference
	Cox model	83.29 (73.95–92.62)	0.894
600 days	RSF model	86.66 (77.01–96.31)	Reference
	Cox model	87.37 (78.57–96.17)	0.685
900 days	RSF model	89.90 (81.64–98.16)	Reference
	Cox model	89.65 (81.29–98.00)	0.768

<sup>†</sup>, Delong test comparing the RSF model to the LASSO model at different time points. RSF, random survival forest; tAUC, time-dependent area under the curve; CI, confidence interval.

**Table S3** Univariate and multivariate analyses of the factors for the first MPE recurrence requiring intervention within follow-up in NSCLC patients with actionable mutation

Parameters	Univariate Cox regression		Multivariate Cox regression	
	HR (95% CI)	P value	HR (95% CI)	P value
<b>Clinical parameters</b>				
Age	1.00 (0.97–1.04)	0.798	–	–
Gender (female)	0.48 (0.21–1.14)	0.098	–	–
ECOG PS $\geq$ 2	0.93 (0.12–6.96)	0.941	–	–
Stage IVB	2.89 (1.10–7.58)	0.031	8.46 (2.35–30.41)	0.001
Liver metastases	0.79 (0.11–5.97)	0.821	–	–
Bone metastases	2.65 (1.11–6.34)	0.028	–	–
Contralateral lung metastases	0.65 (0.15–2.81)	0.564	–	–
Brain metastases	1.06 (0.25–4.60)	0.936	–	–
Adrenal gland metastases	0.45 (0.06–3.36)	0.434	–	–
<b>MPE control measurements within 30 days</b>				
Indwelling pleural catheter	1.90 (0.44–8.23)	0.388	–	–
Intrapleural perfusion	2.13 (0.78–5.83)	0.141	–	–
<b>Qualitative parameters</b>				
Primary lesion adjacent to pleura	0.47 (0.17–1.28)	0.140	–	–
Pleural FDG uptake (+)	1.01 (0.37–2.77)	0.981	–	–
<b>Pleural FDG uptake pattern</b>				
Encasement	1.64 (0.38–7.20)	0.510	–	–
Nodular	1.58 (0.61–4.10)	0.344	–	–
Linear	0.68 (0.26–1.75)	0.419	–	–
<b>Quantitative parameters</b>				
LN SUV <sub>max</sub> >4.50 g/mL	3.73 (1.25–11.19)	0.019	4.26 (1.24–14.65)	0.022
N1 SUV <sub>max</sub> >3.07 g/mL	2.79 (1.07–7.29)	0.036	–	–
N2 SUV <sub>max</sub> >3.84 g/mL	1.94 (0.81–4.66)	0.136	–	–
N3 SUV <sub>max</sub> >4.52 g/mL	2.26 (0.74–6.91)	0.154	–	–
Pleural SUV <sub>max</sub> >2.17 g/mL	0.89 (0.37–2.15)	0.793	–	–
Pleural MTV >18.00 mL	0.78 (0.30–2.03)	0.607	–	–
Pleural TLG >30.32 g	0.78 (0.32–1.92)	0.595	–	–
Primary SUV <sub>max</sub> >11.09 g/mL	0.70 (0.29–1.69)	0.433	–	–
<b>Pleural fluid parameters</b>				
p-CEA >15.6 $\mu$ g/L	0.83 (0.27–2.49)	0.733	–	–
p-LDH >786 U/L	1.93 (0.76–4.92)	0.169	–	–
p-Glucose >6.9 mmol/L	1.75 (0.70–4.37)	0.227	–	–

MPE, malignant pleural effusion; NSCLC, non-small cell lung cancer; ECOG PS, Eastern Cooperative Oncology Group performance status; FDG, <sup>18</sup>F-fluorodeoxyglucose; LN, lymph nodes; SUV<sub>max</sub>, maximum standardized uptake value; MTV, metabolic tumor volume; TLG, total lesion glycolysis; p-CEA, pleural fluid carcinoma embryonic antigen; p-LDH, pleural fluid lactate dehydrogenase; HR, hazard ratio; CI, confidence interval.