Appendix 1 Supplementary methods: search strategies

PubMed

No	Items	Results
#1	Carcinoma, Non-Small-Cell Lung [MeSH Terms] OR NSCLC [Title/Abstract] OR ((lung cancer*[Title/Abstract] OR lung carcinoma [Title/Abstract] OR lung neoplasm*[Title/Abstract] OR lung tumor*[Title/Abstract] OR lung tumour*[Title/Abstract]) AND (non small cell*[Title/Abstract] OR nonsmall cell*[Title/Abstract]))	111,487
#2	"Programmed Cell Death 1 Receptor"[Mesh] OR "PD-1"[Title/Abstract] OR "PD-L1"[Title/Abstract] OR "programmed cell death 1"[Title/Abstract] OR "programmed cell death ligand 1"[Title/Abstract] OR "immunotherapy"[Title/Abstract] OR "immune related therapy"[Title/Abstract] OR "immune checkpoint inhibitors"[Title/Abstract] OR "Pembrolizumab"[Title/Abstract] OR "Atezolizumab"[Title/Abstract] OR "Nivolumab"[Title/Abstract] OR "Durvalumab"[Title/Abstract] OR "Penpulimab"[Title/Abstract] OR "Camrelizumab"[Title/Abstract] OR "Tislelizumab"[Title/Abstract] OR "Sintilimab"[Title/Abstract] OR "Toripalimab"[Title/Abstract] OR "Cemiplimab"[Title/Abstract] OR "Sugemalimab"[Title/Abstract] OR zimberelimab[Title/Abstract] OR Serplulimab[Title/Abstract] OR pucotenlimab[Title/Abstract] OR adebrelimab[Title/Abstract] OR Envafolimab[Title/Abstract]	194,559
#3	"first line"[Title/Abstract] OR "first-line"[Title/Abstract] OR "1st line"[Title/Abstract] OR "1st-line"[Title/Abstract] OR "front line"[Title/Abstract] OR "untreated"[Title/Abstract] OR "naive"[Title/Abstract] OR "newly diagnosed"[Title/Abstract] OR "new diagnostic"[Title/Abstract]	517,614
#4	("Randomized Controlled Trial"[Publication Type] OR "controlled clinical trial"[Title/Abstract] OR "randomized" [Title/Abstract] OR "randomised" [Title/Abstract] OR "Placebo"[Title/Abstract] OR "random*"[Title/Abstract] OR "RCT"[Title/Abstract]) NOT (animals [MeSH Terms] NOT humans [MeSH Terms])	1,611,316
#5	"phase 3" [Title/Abstract] OR "phase III" [Title/Abstract]	66,736
#6	#1 AND #2 AND #3 AND #4 AND #5	195

Web of Science

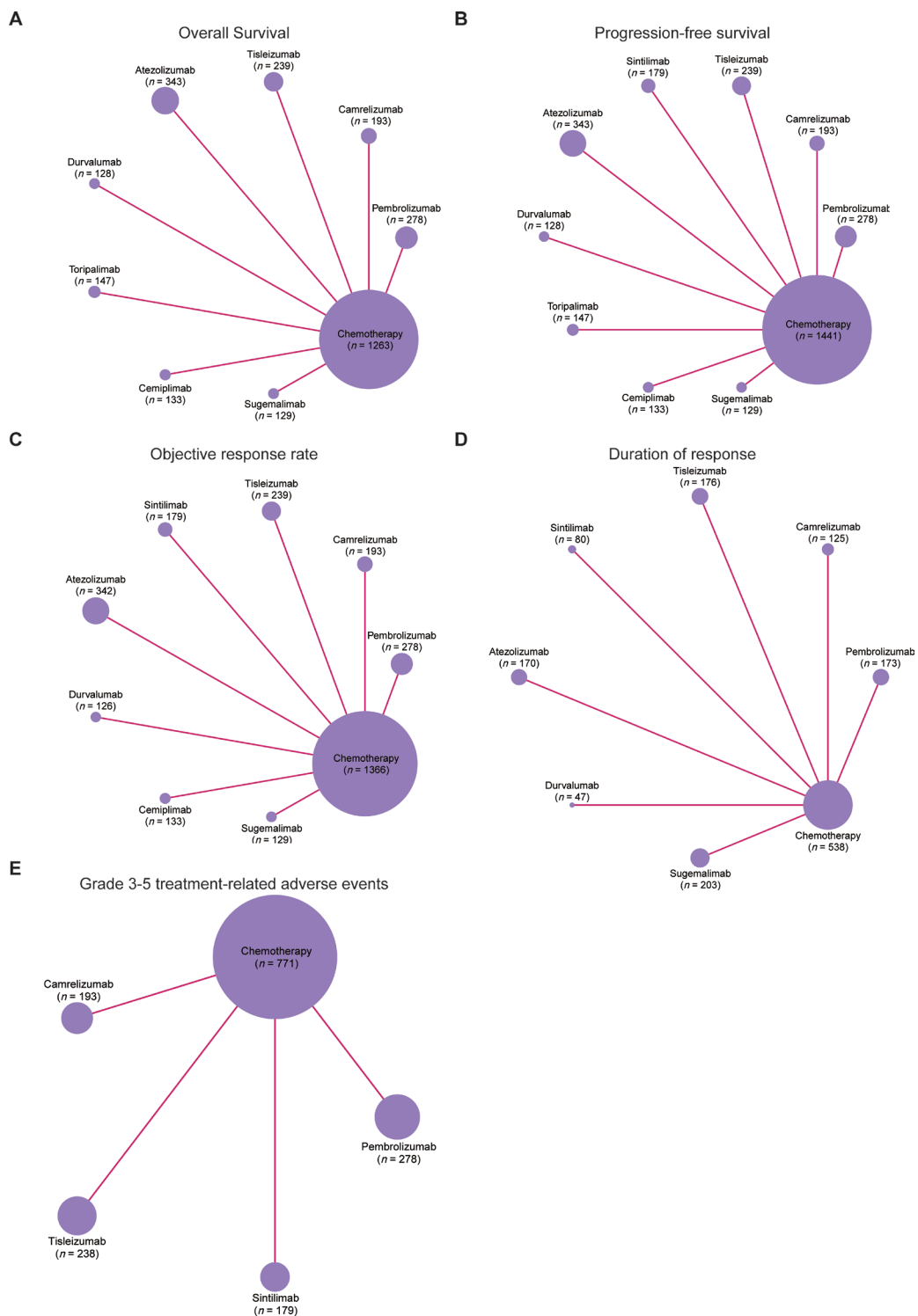| No	Items	Results
#1	TS=("Carcinoma, Non-Small-Cell Lung" OR "Carcinoma, Non Small Cell Lung" OR "Carcinomas, Non-Small-Cell Lung" OR "Lung Carcinoma, Non-Small-Cell" OR "Lung Carcinomas, Non-Small-Cell" OR "Non-Small-Cell Lung Carcinomas" "Non-Small-Cell Lung Carcinoma" OR "Non Small Cell Lung Carcinoma" OR "Carcinoma, Non-Small Cell Lung" OR "Non-Small Cell Lung Carcinoma" OR "Non-Small Cell Lung Cancer" OR "Nonsmall Cell Lung Cancer" OR NSCLC)	208,730
#2	TS=("Programmed Cell Death 1 Receptor" OR PD-1 OR PD-L1 OR "programmed cell death-1" OR "programmed cell death ligand-1" OR immunotherapy OR "immune-related therapy" OR "Immune Checkpoint Inhibitors" OR Pembrolizumab OR Atezolizumab OR Nivolumab OR Durvalumab OR Tremelimumab OR Camrelizumab OR Tislelizumab OR Sintilimab OR Toripalimab OR Cemiplimab OR Sugemalimab OR Penpulimab OR zimberelimab OR Serplulimab OR pucotenlimab OR adebrelimab OR Envafolimab)	434,597
#3	TS=("first line" OR first-line OR "1st line" OR 1st-line OR "front line" OR untreated OR naive OR "newly diagnosed" OR "new diagnostic")	935,205
#4	TS=("randomized controlled trial" OR "controlled clinical trial" OR "random allocation" OR Placebo OR Random* OR RCT)	4,375,230
#5	TS=("phase 3" OR "phase III")	182,207
#6	#1 AND #2 AND #3 AND #4 AND #5	592
#7	Refined by: Indexes=SCI-EXPANDED, ESCI Document Types: Article	297

Embase

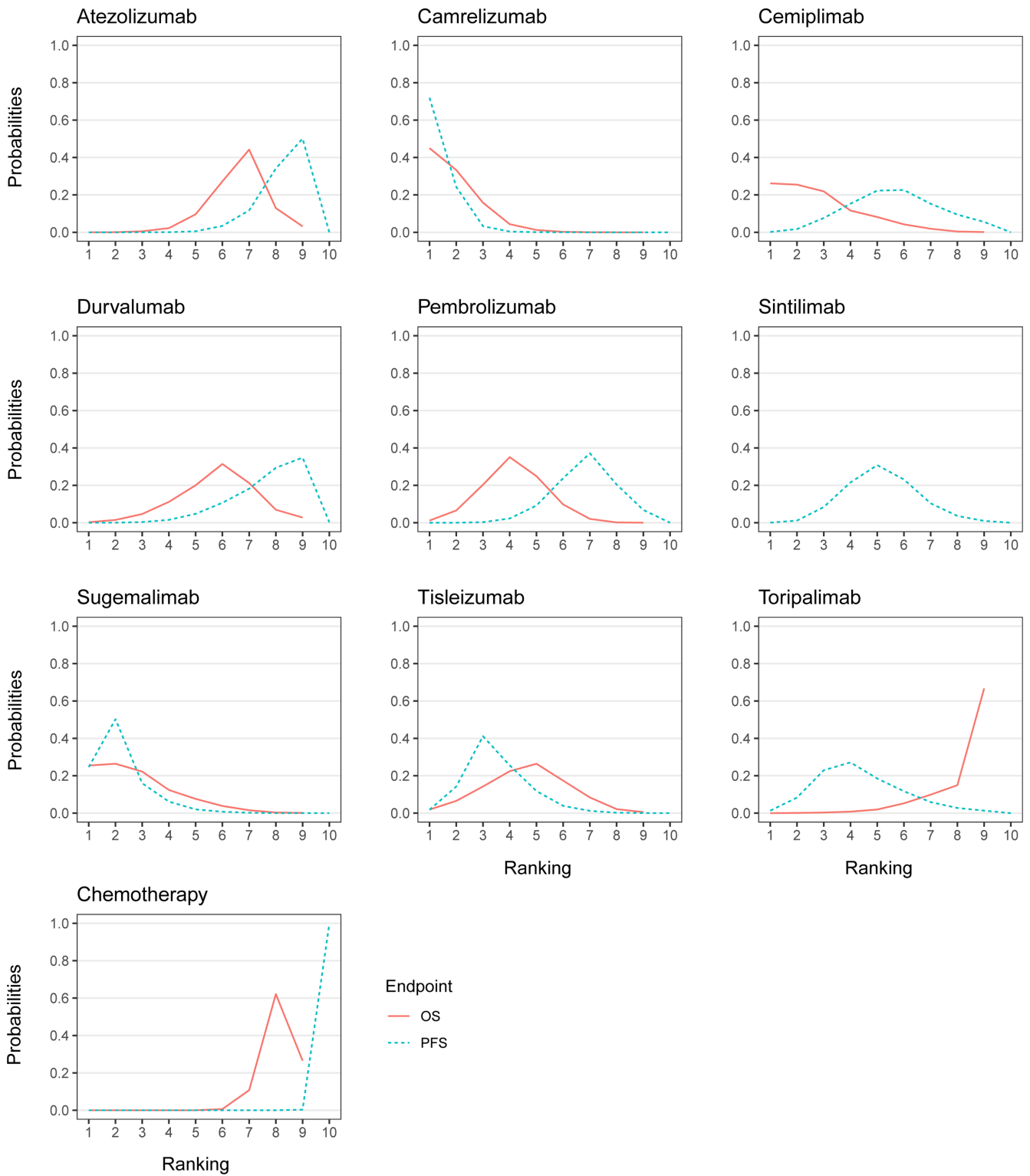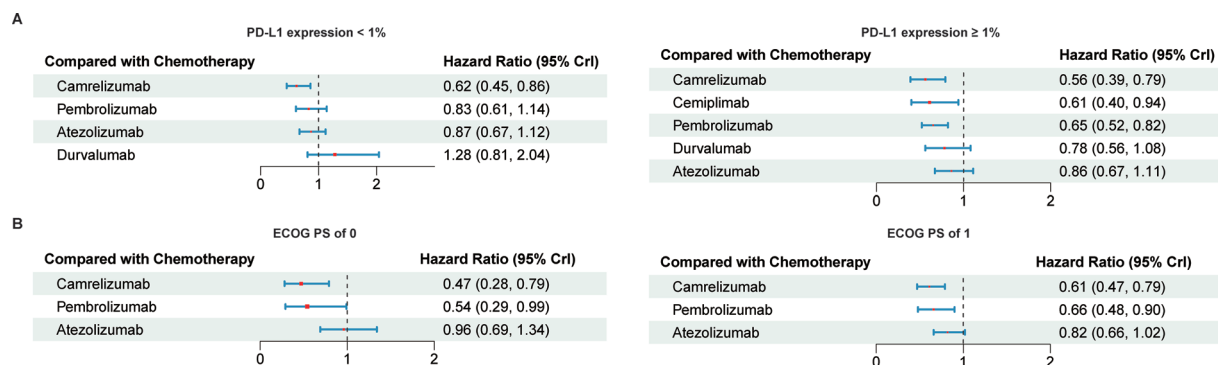| No	Items	Results
#1	'non small cell lung cancer'/exp OR ('carcinoma non small cell lung':ab,ti OR 'non small cell lung carcinoma':ab,ti OR 'non small cell lung cancer':ab,ti OR 'nonsmall cell lung cancer':ab,ti OR 'nsclc':ab,ti)	251,536
#2	'pd-1':ab,ti OR 'pd-l1':ab,ti OR 'programmed cell death 1':ab,ti OR 'programmed cell death ligand 1':ab,ti OR 'immunotherapy':ab,ti OR 'immune related therapy':ab,ti OR 'immune checkpoint inhibitors':ab,ti OR 'pembrolizumab':ab,ti OR 'atezolizumab':ab,ti OR 'nivolumab':ab,ti OR 'durvalumab':ab,ti OR 'penpulimab':ab,ti OR 'camrelizumab':ab,ti OR 'tislelizumab':ab,ti OR 'sintilimab':ab,ti OR 'toripalimab':ab,ti OR 'cemiplimab':ab,ti OR 'sugemalimab':ab,ti OR zimberelimab:ab,ti OR serplulimab:ab,ti OR pucotenlimab:ab,ti OR adebrelimab:ab,ti OR envafolimab:ab,ti	291,293
#3	'randomized controlled trial'/exp OR ('controlled clinical trial':ab,ti OR 'randomized':ab,ti OR 'randomised':ab,ti OR 'placebo':ab,ti OR 'random*':ab,ti OR 'rct':ab,ti)	2,362,455
#4	'phase 3 clinical trial'/exp OR ('phase 3':ab,ti OR 'phase iii':ab,ti)	157,370
#5	'first-line treatment'/exp OR ('first line':ab,ti OR 'first-line':ab,ti OR '1st line':ab,ti OR '1st-line':ab,ti OR 'front line':ab,ti OR 'untreated':ab,ti OR 'naive':ab,ti OR 'newly diagnosed':ab,ti OR 'new diagnostic':ab,ti)	819,493
#6	#1 AND #2 AND #3 AND #4 AND #5 AND ([article]/lim OR [article in press]/lim)	188

ClinicalTrials (n=117)

(Squamous Non-small-cell Lung Cancer) AND (Pembrolizumab OR Atezolizumab OR Nivolumab OR Durvalumab OR Tremelimumab OR Camrelizumab OR Tislelizumab OR Sintilimab OR Toripalimab OR Cemiplimab OR Sugemalimab OR Penpulimab OR zimberelimab OR Serplulimab OR pucotenlimab OR adebrelimab OR Envafolimab OR Immunotherapy OR PD-1 OR PD-L1) AND (Phase 3 OR Phase III)
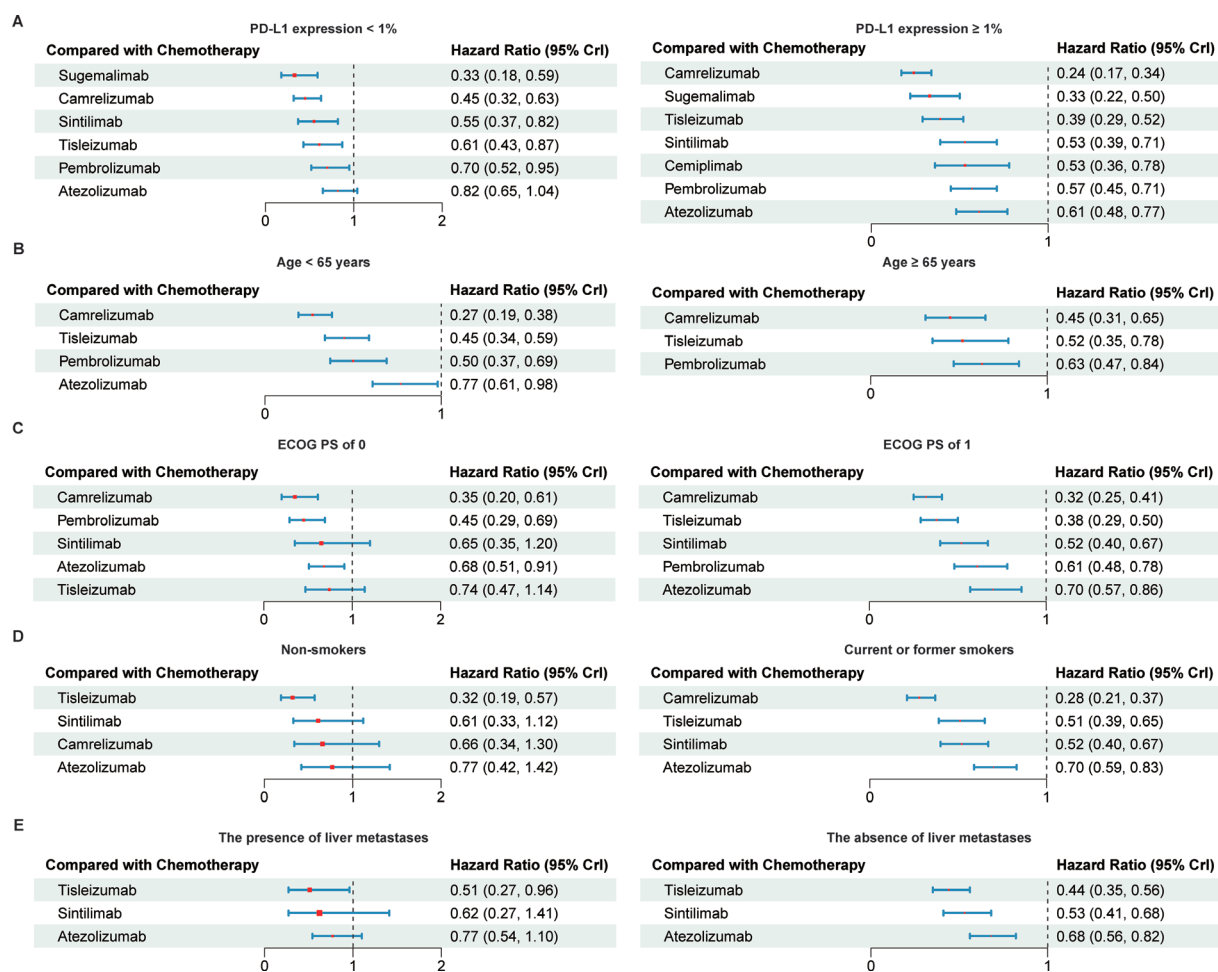
Figure S1 Network plots. Comparisons were generated on overall survival (A), progression-free survival (B), objective response rate (C), duration of response (D) and or grade 3-5 treatment-related adverse events (E). Each line represents a type of head-to-head comparison. Each circle symbolizes an intervention, and all interventions were combined with chemotherapy (e.g., if the intervention was pembrolizumab, it was pembrolizumab in combination with chemotherapy), except for the circle representing chemotherapy. The size of the circles is proportional to the number of patients included.
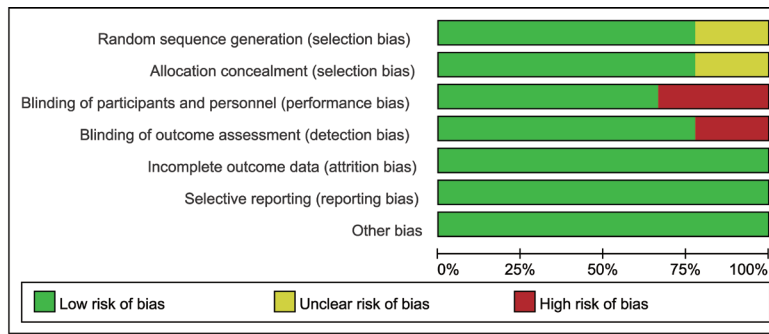
Figure S2 Ranking curves for the probability of each treatment being ranked from first to last on OS (orange solid line) and PFS (cyan dashed line). All treatments related to immunotherapy are combination regimens with chemotherapy. PFS, progression-free survival; OS, overall survival.

Figure S3 Forest plots of the subgroup analysis for overall survival according to the PD-L1 expression levels (A) and ECOG PS (B). All treatments that are compared to chemotherapy are combination regimens with chemotherapy. ECOG PS, Eastern Cooperative Oncology Group performance status; PD-L1, programmed cell death ligand 1.
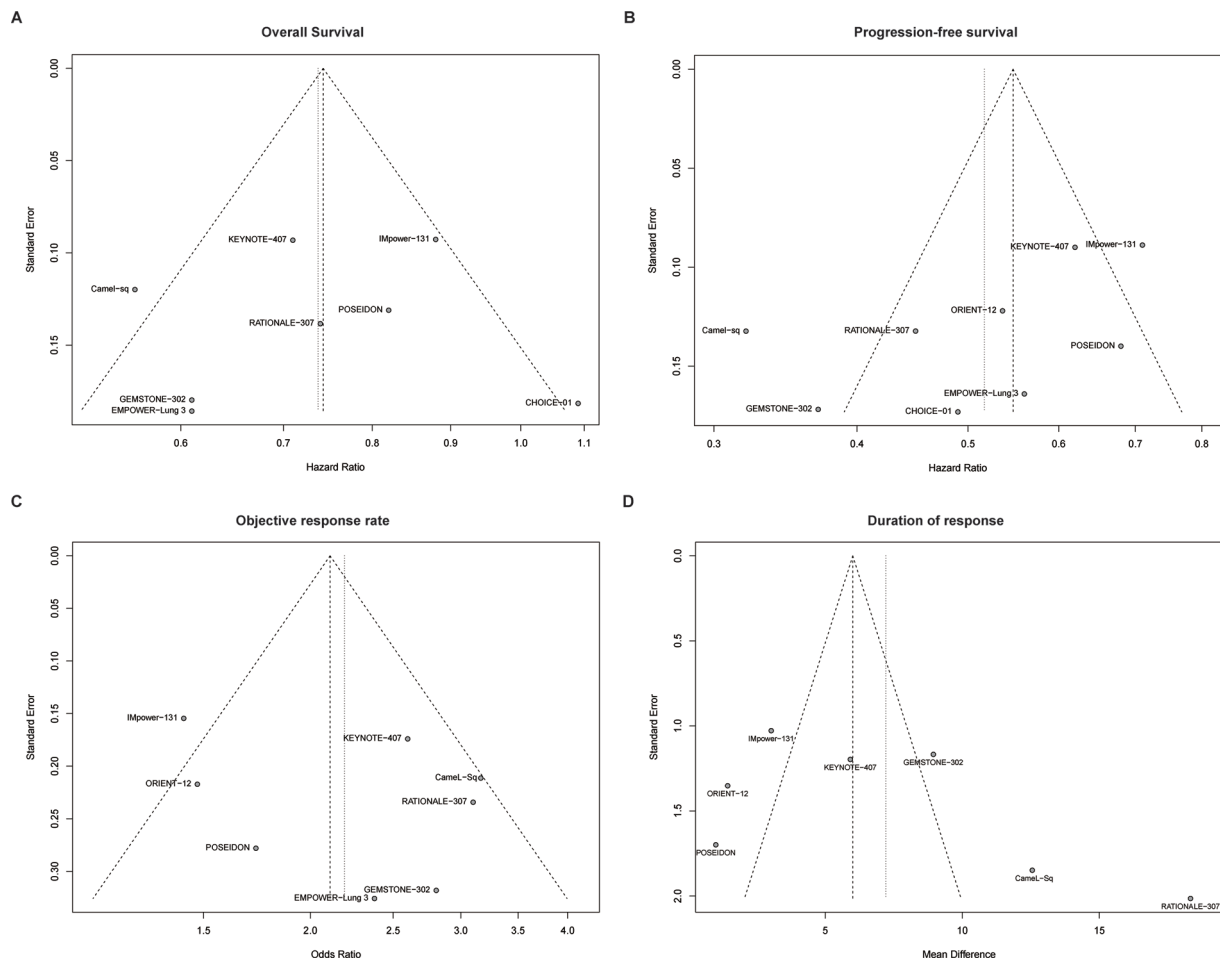

Figure S4 Forest plots of the subgroup analysis for progression-free survival according to the PD-L1 expression levels (A), age (B), ECOG PS (C), smoking status (D) and liver metastases (E). All treatments that are compared to chemotherapy are combination regimens with chemotherapy. ECOG PS, Eastern Cooperative Oncology Group performance status; PD-L1, programmed cell death ligand 1.

Figure S5 Summary of the Risk of bias assessment for the studies included in this network meta-analysis.

Figure S6 Funnel plot to detect the publication bias of included studies.