

Supplementary Table 1. Search strategy and results

(1) PICO model

Population	Patients with liver-confined hepatocellular carcinoma
Intervention	Proton beam therapy
Comparison	Not specified
Outcomes	Survival and toxicity

(2) Keywords

	Fields	Keywords	Remarks
P	MeSH	Carcinoma, hepatocellular	A
	MeSH	Liver neoplasms	
	TIAB	Hepatocellular	B
	TIAB	Liver*	
	TIAB	Hepati*	
	TIAB	Neoplasm*	C
	TIAB	Tumor*	
	TIAB	Tumour*	
	TIAB	Carcinoma*	
	TIAB	Cancer*	
	TIAB	Malignan*	
	TIAB	B AND C	D
	TIAB	Hepatoma*	E
I	TIAB	HCC	
	TIAB	AOR DORE	F
	MeSH	Proton therapy	G
	MeSH	Protons	
	MeSH	Radiotherapy	
	TIAB	Proton*	
	TIAB	Proton beam	
	TIAB	Radiotherap*	
	TIAB	Radiation therap*	
	TIAB	Radiation treatment*	
	TIAB	Targeted radiation	
	TIAB	External radiation	
	TIAB	External beam	
TIAB	EBRT		
O	MeSH	Survival	H
	MeSH	Progression-free survival	
	MeSH	Disease-free survival	
	TIAB	Surviv*	
	TIAB	Progression free surviv*	
	TIAB	Event-free surviv*	
	TIAB	Disease free surviv*	
	TIAB	Overall surviv*	
	TIAB	Toxic*	
	TIAB	Toxin*	
	TIAB	F AND G AND H	

Supplementary Table 1. Continued

(3) Search strategy

Database	Search strategy
Medline	("carcinoma, hepatocellular"[MeSH Terms] OR "Liver neoplasms"[MeSH Terms] OR (("Hepatocellular"[Title/Abstract] OR "liver"[Title/Abstract] OR "hepati"[Title/Abstract]) AND ("neoplasm"[Title/Abstract] OR "tumor"[Title/Abstract] OR "tumour"[Title/Abstract] OR "carcinoma"[Title/Abstract] OR "cancer"[Title/Abstract] OR "malignan"[Title/Abstract])) OR ("hepatoma"[Title/Abstract] OR "HCC"[Title/Abstract])) AND ("Proton therapy"[MeSH Terms] OR "Protons"[MeSH Terms] OR "Radiotherapy"[MeSH Terms] OR ("proton"[Title/Abstract] OR "Proton beam"[Title/Abstract] OR "radiotherap"[Title/Abstract] OR "radiation therap"[Title/Abstract] OR "radiation treatment"[Title/Abstract] OR "Targeted radiation"[Title/Abstract] OR "External radiation"[Title/Abstract] OR "External beam"[Title/Abstract] OR "EBRT"[Title/Abstract])) AND ("Survival"[MeSH Terms] OR "Progression-free survival"[MeSH Terms] OR "Disease-free survival"[MeSH Terms] OR ("surviv"[Title/Abstract] OR "progression free surviv"[Title/Abstract] OR "event free surviv"[Title/Abstract] OR "disease free surviv"[Title/Abstract] OR "overall surviv"[Title/Abstract] OR "toxic"[Title/Abstract] OR "toxin"[Title/Abstract]))
EMBASE	((('liver cell carcinoma'/exp OR 'liver tumor'/exp OR 'liver cancer'/exp) OR (('hepatocellular':ti,ab OR 'liver':ti,ab OR 'hepati*':ti,ab) AND ('neoplasm*':ti,ab OR 'tumor*':ti,ab OR 'tumour*':ti,ab OR 'carcinoma*':ti,ab OR 'cancer*':ti,ab OR 'malignan*':ti,ab)) OR ('hepatoma*':ab,ti OR 'hcc':ab,ti)) AND (('proton therapy'/exp OR 'proton'/exp OR 'proton radiation'/exp OR 'radiotherapy'/exp OR 'external beam radiotherapy'/exp) OR ('proton*':ab,ti OR 'proton beam':ab,ti OR 'radiotherap*':ab,ti OR 'radiation therap*':ab,ti OR 'radiation treatment*':ab,ti OR 'targeted radiation':ab,ti OR 'external radiation':ab,ti OR 'external beam':ab,ti OR 'ebrt':ab,ti)) AND (('survival'/exp OR 'progression free survival'/exp OR 'disease free survival'/exp OR 'overall survival'/exp OR 'toxin'/exp) OR ('survival':ab,ti OR 'progression free survival':ab,ti OR 'disease free survival':ab,ti OR 'surviv*':ab,ti OR 'progression free surviv*':ab,ti OR 'event-free surviv*':ab,ti OR 'disease free surviv*':ab,ti OR 'overall surviv*':ab,ti OR 'toxic*':ab,ti OR 'toxin*':ab,ti))
Cochrane	(MeSH descriptor: [Carcinoma, Hepatocellular] explode all trees OR MeSH descriptor: [Liver Neoplasms] explode all trees OR (((Hepatocellular):ti,ab,kw OR (liver*):ti,ab,kw OR (hepati*):ti,ab,kw) AND ((neoplasm*):ti,ab,kw OR (tumor*):ti,ab,kw OR (tumour*):ti,ab,kw OR (carcinoma*):ti,ab,kw OR (cancer*):ti,ab,kw OR (malignan*):ti,ab,kw)) OR (hepatoma*):ti,ab,kw OR (HCC):ti,ab,kw) AND (MeSH descriptor: [Proton Therapy] explode all trees OR MeSH descriptor: [Protons] explode all trees OR MeSH descriptor: [Radiotherapy] explode all trees OR (proton*):ti,ab,kw OR ("Proton beam"):ti,ab,kw OR (radiotherap*):ti,ab,kw OR (radiation NEXT therap*):ti,ab,kw OR (radiation NEXT treatment*):ti,ab,kw OR ("Targeted radiation"):ti,ab,kw OR ("External radiation"):ti,ab,kw OR ("External beam"):ti,ab,kw OR (EBRT):ti,ab,kw) AND (MeSH descriptor: [Survival] explode all trees OR MeSH descriptor: [Progression-Free Survival] explode all trees OR MeSH descriptor: [Disease-Free Survival] explode all trees OR (surviv*):ti,ab,kw OR ("progression free" NEXT surviv*):ti,ab,kw OR ("event free" NEXT surviv*):ti,ab,kw OR ("disease free" NEXT surviv*):ti,ab,kw OR (overall NEXT surviv*):ti,ab,kw OR (toxic*):ti,ab,kw OR (toxin*):ti,ab,kw)
Web of Science	(((((TI=(Hepatocellular) OR TI=(Liver*) OR TI=(Hepati*) OR AB=(Hepatocellular) OR AB=(Liver*) OR AB=(Hepati*)) AND (TI=(Neoplasm*) OR TI=(Tumor*) OR TI=(Tumour*) OR TI=(Carcinoma*) OR TI=(Cancer*) OR TI=(Malignan*) OR AB=(Neoplasm*) OR AB=(Tumor*) OR AB=(Tumour*) OR AB=(Carcinoma*) OR AB=(Cancer*) OR AB=(Malignan*)) OR (TI=(Hepatoma*) OR TI=(HCC) OR AB=(Hepatoma*) OR AB=(HCC))) AND (TI=(Proton*) OR TI=(Proton beam) OR TI=(Radiotherap*) OR TI=(Radiation therap*) OR TI=(Radiation treatment*) OR TI=(Targeted radiation) OR TI=(External radiation) OR TI=(External beam) OR TI=(EBRT) OR AB=(Proton*) OR AB=(Proton beam) OR AB=(Radiotherap*) OR AB=(Radiation therap*) OR AB=(Radiation treatment*) OR AB=(Targeted radiation) OR AB=(External radiation) OR AB=(External beam) OR AB=(EBRT))) AND (TI=(Surviv*) OR TI=(Progression free surviv*) OR TI=(Event-free surviv*) OR TI=(Disease free surviv*) OR TI=(Overall surviv*) OR TI=(Toxic*) OR TI=(Toxin*) OR AB=(Surviv*) OR AB=(Progression free surviv*) OR AB=(Event-free surviv*) OR AB=(Disease free surviv*) OR AB=(Overall surviv*) OR AB=(Toxic*) OR AB=(Toxin*))

(4) Summary of search results

	Results	Duplication
Database		
Medline	1,386	1,846
EMBASE	2,912	
Cochrane Library	603	
Web of Science	1,446	
Number of search results (with duplication)	6,347	
Number of search results (without duplication)	4,501	