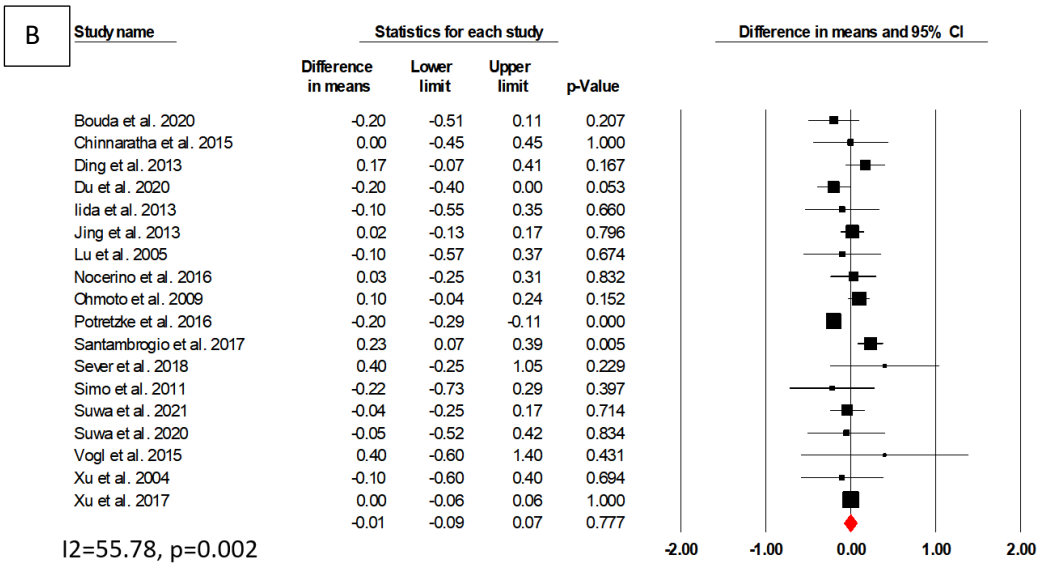
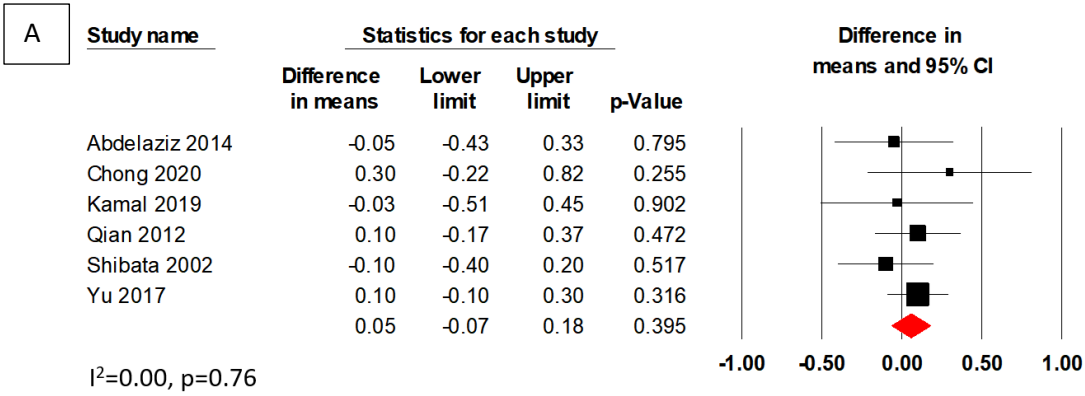


Supplementary Figure 1 MWA vs RFA for intrahepatic HCC lesions. A: Forest plot for odds ratio of tumour size for RCTs; **B:** Forest plot for odds ratio of tumour size for cohort studies.



Supplementary Figure 2 MWA vs RFA for intrahepatic HCC lesions. A: Forest plot for difference in mean tumour size among RCTs. B: Forest plot for difference in mean tumour size among cohort studies.

Supplementary Table 1 OVID MEDLINE Search strategy

<p>0. Resource selected changed to include</p> <ul style="list-style-type: none"> • EBM Reviews – Cochrane Central Register of Controlled trials • EBM Reviews – Cochrane Database of Systematic Reviews • Ovid MEDLINE (R) • Ovid MEDLINE and Epub Ahead of Print, In-process & Other Non-Indexed Citations, Daily and Versions (R) 	<p>Resources broadened in include OVID MEDLINE, Cochrane Central and Cochrane systematic review</p>
<p>1. Exp Catheter Ablation/ → 1 radiofreq* adj (ablat* or treat* or therap*) → 2 rfa* or rft* or rfc* or rca* → 3 1 OR 2 OR 3 → 4</p>	<p>Search terms used to identify relevant results on radiofrequency ablation</p>
<p>2. Ablation therapy → 5 Microwave therapy → 6 microwave* adj3 (ablat* or treat* or therap*) → 7 mwa* or mca* or mwca* → 8 5 OR 6 OR 7 OR 8 → 9</p>	<p>Search terms used to identify relevant results on microwave ablation</p>
<p>3. Liver cancer → 10 Liver cell carcinoma → 11 Exp Liver Neoplasms/ → 12 (liver* or hepat*) adj3 (cancer* or neoplasm*, tumo?r*, carcinoma* or lesion* or malign*) → 13</p>	<p>Search terms used to identify relevant results on hepatocellular carcinoma</p>

HCC → 14

Hepatoma → 15

10 OR 11 OR 12 OR 13 OR 14 OR 15 → 16

4. 4 AND 9 AND 16 → 17

Search used to identify relevant results on MWA vs. RFA in HCC

5. cohort studies/ or longitudinal studies/ or follow-up studies/ or prospective studies/ or retrospective studies/ or cohort.ti,ab. or longitudinal.ti,ab. or prospective.ti,ab. or retrospective.ti,ab → 18

Search terms used to identify relevant results for cohort studies and clinical trials of MWA vs. RFA in HCC

("clinical trial" or "clinical trial, phase i" or "clinical trial, phase ii" or "clinical trial, phase iii" or "clinical trial, phase iv" or "controlled clinical trial" or "multicenter study" or "randomized controlled trial").pt. or double-blind method/ or clinical trials as topic/ or clinical trials, phase i as topic/ or clinical trials, phase ii as topic/ or clinical trials, phase iii as topic/ or clinical trials, phase iv as topic/ or controlled clinical trials as topic/ or randomized controlled trials as topic/ or early termination of clinical trials as topic/ or multicenter studies as topic/ or ((randomi?ed adj7 trial*) or (controlled adj3 trial*) or (clinical adj2 trial*) or ((single or doubl* or tripl* or treb*) and (blind* or mask*))).ti,ab,kw. or ("4 arm" or "four arm").ti,ab,kw. → 19

18 OR 19 → 20

17 AND 20 → 21

- | | |
|--|---|
| 6. (((comprehensive* or integrative or systematic*) adj3 (bibliographic* or review* or literature)) or (meta-analy* or metaanaly* or "research synthesis" or ((information or data) adj3 synthesis) or (data adj2 extract*))).ti,ab. or (cinahl or (cochrane adj3 trial*) or embase or medline or psyclit or (psycinfo not "psycinfo database") or pubmed or scopus or "sociological abstracts" or "web of science").ab. or ("cochrane database of systematic reviews" or evidence report technology assessment or evidence report technology assessment summary).jn. or Evidence Report: Technology Assessment*.jn. or ((review adj5 (rationale or evidence)).ti,ab. and review.pt.) or meta-analysis as topic/ or Meta-Analysis.pt. → 22 | Search terms used to identify relevant results for systematic reviews and meta-analysis of MWA vs. RFA in HCC |
|--|---|

17 AND 22 → 23

Results: Total relevant results on MWA vs. RFA in HCC = **980**

Cohort studies and Clinical trials of MWA vs. RFA in HCC = **478**

Systematic reviews and meta-analysis of MWA vs. RFA in HCC = **70**

Supplementary Table 2 PubMed Search strategy

- | | |
|---|---|
| 0. Unlike OVID Medline, PubMed does not have proximity (or adjacency) operators, hence it was not possible to perform the adj3 search as previously intended for HCC. | Differences between search strategy used in PubMed vs. OVID Medline |
|---|---|

Pubmed requires a minimum of 4 characters to carry out the truncation method. Hence some search terms were affected (e.g. rfa, rft, mca).

1. (((((((("catheter ablation") OR (radiofreq* ablat*)) OR (radiofreq* treat*)) OR (radiofreq* therap*)) OR (rfa*)) OR (rft*)) OR (rfc*)) OR (rca*)) Search terms used to identify relevant results on radiofrequency ablation
2. (((("ablation therapy") OR ("microwave therapy")) OR (microwave* ablat*)) OR (microwave* treat*)) OR (microwave therap*)) OR (mwa* OR mca* OR mwca*) Search terms used to identify relevant results on microwave ablation
3. (((("liver cancer" OR "liver cell carcinoma" OR "liver neoplasms") OR (liver* (cancer* OR neoplasm* OR tumo?r* OR carcinoma* OR lesion* or malign*))) OR (hepat* (cancer* OR neoplasm* OR tumo?r* OR carcinoma* OR lesion* or malign*))) OR (HCC)) OR (hepatoma) Search terms used to identify relevant results on hepatocellular carcinoma
4. (((((((("liver cancer" OR "liver cell carcinoma" OR "liver neoplasms") OR (liver* (cancer* OR neoplasm* OR tumo?r* OR carcinoma* OR lesion* or malign*))) OR (hepat* (cancer* OR neoplasm* OR tumo?r* OR carcinoma* OR lesion* or malign*))) OR (HCC)) OR (hepatoma)) AND (((((((("ablation therapy") OR ("microwave therapy")) OR (microwave* ablat*)) OR (microwave* treat*)) OR (microwave therap*)) OR (mwa* OR mca* OR mwca*)) AND (((((((("catheter ablation") OR (radiofreq* ablat*)) OR (radiofreq*

treat*)) OR (radiofreq* therap*)) OR (rfa*)) OR (rft*)) OR (rfc*)) OR (rca*))

5. ((cohort studies[mesh:noexp] OR longitudinal studies[mesh:noexp] OR follow-up studies[mesh:noexp] OR prospective studies[mesh:noexp] OR retrospective studies[mesh:noexp] OR cohort[TIAB] OR longitudinal[TIAB] OR prospective[TIAB] OR retrospective[TIAB]) OR ("Clinical Trial" [PT:NoExp] OR "clinical trial, phase i"[pt] OR "clinical trial, phase ii"[pt] OR "clinical trial, phase iii"[pt] OR "clinical trial, phase iv"[pt] OR "controlled clinical trial"[pt] OR "multicenter study"[pt] OR "randomized controlled trial"[pt] OR "Clinical Trials as Topic"[mesh:noexp] OR "clinical trials, phase i as topic"[MeSH Terms:noexp] OR "clinical trials, phase ii as topic"[MeSH Terms:noexp] OR "clinical trials, phase iii as topic"[MeSH Terms:noexp] OR "clinical trials, phase iv as topic"[MeSH Terms:noexp] OR "controlled clinical trials as topic"[MeSH Terms:noexp] OR "randomized controlled trials as topic"[MeSH Terms:noexp] OR "early termination of clinical trials"[MeSH Terms:noexp] OR "multicenter studies as topic"[MeSH Terms:noexp] OR "Double-Blind Method"[Mesh] OR ((randomised[TIAB] OR randomized[TIAB]) AND (trial[TIAB] OR trials[tiab])) OR ((single[TIAB] OR double[TIAB] OR doubled[TIAB] OR triple[TIAB] OR

Search terms used to identify relevant results for cohort studies and clinical trials of MWA vs. RFA in HCC

tripled[TIAB] OR treble[TIAB] OR treble[TIAB])
 AND (blind*[TIAB] OR mask*[TIAB])) OR ("4
 arm"[tiab] OR "four arm"[tiab])) AND ((((((("liver
 cancer" OR "liver cell carcinoma" OR "liver
 neoplasms") OR (liver* (cancer* OR neoplasm* OR
 tumor* OR carcinoma* OR lesion* OR malign*)))
 OR (hepat* (cancer* OR neoplasm* OR tumor* OR
 carcinoma* OR lesion* OR malign*))) OR (HCC)
 OR (hepatoma)) AND ((((((("ablation therapy") OR
 ("microwave therapy") OR (microwave* ablat*)
 OR (microwave* treat*) OR (microwave therap*)
 OR (mwa* OR mca* OR mwca*))) AND
 ((((((("catheter ablation") OR (radiofreq* ablat*)
 OR (radiofreq* treat*) OR (radiofreq* therap*) OR
 (rfa*) OR (rft*) OR (rfc*) OR (rca*)))

6. ((systematic*[tiab] AND (bibliographic*[TIAB] OR literature[tiab] OR review[tiab] OR reviewed[tiab] OR reviews[tiab])) OR (comprehensive*[TIAB] AND (bibliographic*[TIAB] OR literature[tiab])) OR "cochrane database syst rev"[Journal] OR "Evidence report/technology assessment (Summary)"[journal] OR "Evidence report/technology assessment"[journal] OR "integrative literature review"[tiab] OR "integrative research review"[tiab] OR "integrative review"[tiab] OR "research synthesis"[tiab] OR "research integration"[tiab] OR cinahl[tiab] OR embase[tiab] OR medline[tiab] OR psyclit[tiab] OR (psycinfo[tiab] NOT "psycinfo database"[tiab]) OR pubmed[tiab] OR scopus[tiab] OR "web of
- Search terms used to identify relevant results for systematic reviews and meta-analysis of MWA vs. RFA in HCC

science"[tiab] OR "data synthesis"[tiab] OR meta-
 analys*[tiab] OR meta-analyz*[tiab] OR meta-
 analyt*[tiab] OR metaanalys*[tiab] OR
 metaanalyz*[tiab] OR metaanalyt*[tiab] OR "meta-
 analysis as topic"[MeSH:noexp] OR Meta-
 Analysis[ptyp] OR ((review[tiab] AND
 (rationale[tiab] OR evidence[tiab])) AND
 review[pt]) AND (((((((("liver cancer" OR "liver cell
 carcinoma" OR "liver neoplasms") OR (liver*
 (cancer* OR neoplasm* OR tumo?r* OR
 carcinoma* OR lesion* or malign*))) OR (hepat*
 (cancer* OR neoplasm* OR tumo?r* OR
 carcinoma* OR lesion* or malign*))) OR (HCC))
 OR (hepatoma)) AND (((((((("ablation therapy") OR
 ("microwave therapy")) OR (microwave* ablat*))
 OR (microwave* treat*)) OR (microwave therap*))
 OR (mwa* OR mca* OR mwca*))) AND
 (((((((("catheter ablation") OR (radiofreq* ablat*))
 OR (radiofreq* treat*)) OR (radiofreq* therap*)) OR
 (rfa*)) OR (rft*)) OR (rfc*)) OR (rca*)))

Supplementary Table 3 Clinicaltrials.gov Search strategy

0.	<p>Truncation tool is not available in ClinicalTrials.gov</p> <p>ClinicalTrials.gov does not have proximity (or adjacency) operators, hence it was not possible to perform the adj3 search as previously intended for HCC.</p>	<p>Differences between search strategy used in ClinicalTrials.gov vs. OVID Medline</p>
1.	<p>Radiofrequency ablation OR Catheter ablation OR Radiofrequency treatment OR Radiofrequency therapy OR rfa OR rft OR rfc OR rca</p>	<p>Search terms used to identify relevant results on</p>

		radiofrequency ablation
2.	Microwave ablation OR Ablation therapy OR Microwave therapy OR Microwave treatment OR mwa OR mca OR mwca	Search terms used to identify relevant results on microwave ablation
3.	Hepatocellular Carcinoma OR Hepatoma OR Liver Carcinoma OR Liver cell carcinoma OR Adult liver cancers OR Carcinoma liver OR Hepatic cell carcinoma OR Carcinoma hepatocellular OR Carcinoma of Liver OR Liver neoplasms OR HCC	Search terms used to identify relevant results on hepatocellular carcinoma
4.	(Radiofrequency ablation OR Catheter ablation OR Radiofrequency treatment OR Radiofrequency therapy OR rfa OR rft OR rfc OR rca) AND (Microwave ablation OR Ablation therapy OR Microwave therapy OR Microwave treatment OR mwa OR mca OR mwca) AND (Hepatocellular Carcinoma OR Hepatoma OR Liver Carcinoma OR Liver cell carcinoma OR Adult liver cancers OR Carcinoma liver OR Hepatic cell carcinoma OR Carcinoma hepatocellular OR Carcinoma of Liver OR Liver neoplasms OR HCC)	Search used to identify relevant results on MWA vs. RFA in HCC
5.	Adults (18-64) and Older adults (65+)	Filters applied

Supplementary Table 4 Embase database search strategy

0.	Unlike OVID Medline, Cochrane database utilises NEAR/n (n representing the number of words inbetween) as a proximity operator.	Differences between search strategy used in EMBASE database vs. OVID Medline
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There was significant overlap between EMBASE and MEDLINE results however it is not possible to purely filter out EMBASE results.

- | | |
|--|--|
| 1. 'catheter ablation'/exp OR 'catheter ablation' OR (radiofreq* NEAR/1 (ablat* OR treat* OR therap*)) OR rfa* OR rft* OR rfc* OR rca* → 1 | Search terms used to identify relevant results on radiofrequency ablation |
| 2. ('ablation therapy' OR microwave) AND therapy OR (microwave* NEAR/3 (ablat* OR treat* OR therap*)) OR mwa* OR mca* OR mwca* → 2 | Search terms used to identify relevant results on microwave ablation |
| 3. ('liver cancer' OR 'liver cell carcinoma' OR liver) AND neoplasms OR hcc OR hepatoma → 3 | Search terms used to identify relevant results on hepatocellular carcinoma |
| 4. #1 AND #2 AND #3 | Search terms were then combined to yield results on MWA vs. RFA in HCC |
| 5. #1 AND #2 AND #3 AND [humans]/lim AND [embase]/lim → 5 | Search terms were then combined to yield results on MWA vs. RFA in HCC in humans and limited to EMBASE |

6.	#5 AND ('clinical trial'/de OR 'cohort analysis'/de OR 'comparative study'/de OR 'controlled clinical trial'/de OR 'controlled study'/de OR 'major clinical study'/de OR 'observational study'/de OR 'phase 2 clinical trial topic'/de OR 'phase 3 clinical trial topic'/de OR 'prospective study'/de OR 'randomized controlled trial'/de OR 'randomized controlled trial topic'/de OR 'retrospective study'/de)	Search terms used to identify relevant results for cohort studies and clinical trials of MWA vs. RFA in HCC
7.	#5 AND ('evidence based medicine'/de OR 'evidence based practice'/de OR 'meta analysis'/de OR 'meta analysis topic'/de OR 'systematic review'/de OR 'systematic review topic'/de)	Search terms used to identify relevant results for systematic reviews and meta-analysis of MWA vs. RFA in HCC

Supplementary Table 5 Web of Science database search strategy

0.	Unlike OVID Medline, Web of Science database utilises NEAR/n (n representing the number of words inbetween) as a proximity operator. Unable to filter based on study design	Differences between search strategy used in Web of Science database vs. OVID Medline
1.	TS = "Catheter ablation" OR TS = (radiofreq* NEAR/1 (ablat* OR treat* OR therap*))	Search terms used to identify relevant results on radiofrequency ablation

2.	TS = "Ablation therapy" OR TS = "microwave therapy" OR TS = (microwave* NEAR/3 ablat*) OR TS = (microwave* NEAR/3 treat*) OR TS = (microwave* NEAR/3 therap*) OR TS = mwa* OR TS = mca* OR TS = mwca*	Search terms used to identify relevant results on microwave ablation
3.	TS = "Liver cancer" OR TS = "Liver cell carcinoma" OR TS = "Liver neoplasms" OR TS = ((liver* OR hepat*) NEAR/3 (cancer* OR neoplasm* OR tumo?r* OR carcinoma* OR lesion*)) OR TS = HCC OR TS = Hepatoma	Search terms used to identify relevant results on hepatocellular carcinoma
4.	#3 AND #2 AND #1	Search used to identify relevant results on MWA vs. RFA in HCC
5.	Refined search to "Gastroenterology Hepatology"	Filters applied

Supplementary Table 6 Summary of quality assessment for RCTs

Authors	Study design	Overall	Randomization	Blinding	Accounted
Abdelaziz, 2014	RCT	3	2	0	1
Chong, 2020	RCT	4	2	1	1
Kamal, 2019	RCT	3	2	0	1
Qian, 2012	RCT	3	2	0	1
Shibata, 2002	RCT	4	2	1	1
Tian, 2014	RCT	4	2	1	1

Vietti, 2018	RCT	4	2	1	1
Yu, 2017	RCT	2	1	0	1

Supplementary Table 7 Summary of quality assessment for cohort studies

Author, Date	Study design	Overall	Selection				Comparability	Outcome		
			1	2	3	4		1	2	3
Abdel-Samiee, 2020	Retro	8	1	1	1	1	2	0	1	1
Bouda, 2020	Retro	9	1	1	1	1	2	1	1	1
Chinnaratha, 2014	Retro	9	1	1	1	1	2	1	1	1
Cillo, 2014	Pros & Retro	8	1	1	1	1	2	1	1	0
Ciruolo, 2020	Retro	8	1	1	1	1	2	0	1	1
Ding, 2013	Retro	9	1	1	1	1	2	1	1	1
Du, 2020	Retro	9	1	1	1	1	2	1	1	1
Gaia, 2021	Retro	9	1	1	1	1	2	1	1	1
Ghweil, 2019	Pros	4	1	1	0	1	0	0	1	0
Iida, 2013	Retro	8	1	1	1	1	2	1	1	0
Jing, 2013	Retro	9	1	1	1	1	2	1	1	1
Kuang, 2011	Pros	9	1	1	1	1	2	1	1	1
Kumbar, 2018	Retro	7	1	1	1	1	1	1	1	0
Lee KF, 2017	Retro	8	1	1	1	1	2	1	1	0
Liu, 2018	Retro	9	1	1	1	1	2	1	1	1
Loriaud, 2018	Retro	9	1	1	1	1	2	1	1	1
Lu, 2005	Retro	9	1	1	1	1	2	1	1	1
Mocan, 2017	Retro	8	1	1	1	1	2	1	1	0
Nocerino, 2016	Retro	7	1	1	1	1	2	1	0	0

Ohmoto, 2008	Retro	8	1	1	1	1	2	1	1	0
Potretzke, 2016	Retro	9	1	1	1	1	2	1	1	1
Sakaguchi, 2009	Pros	8	1	1	1	1	2	1	1	0
Santambrogio, 2017	Retro	8	1	1	1	1	2	1	1	0
Sever, 2018	Retro	9	1	1	1	1	2	1	1	1
Shum, 2016	Retro	5	1	1	0	1	1	0	1	0
Simo, 2011	Retro	8	1	1	1	1	2	1	0	1
Suwa, 2021	Retro	9	1	1	1	1	2	1	1	1
Suwa, 2020	Retro	9	1	1	1	1	2	1	1	1
Vogl, 2015	Retro	8	1	1	1	1	2	1	1	0
Xu, 2004	Retro	9	1	1	1	1	2	1	1	1
Xu, 2017	Retro	8	1	1	1	1	2	1	1	0
Yin, 2009	Retro	9	1	1	1	1	2	1	1	1
Zhang, 2013	Retro	8	1	1	1	1	2	1	1	0
Zhang, 2014	Pros	6	1	1	0	1	2	0	1	0
