Supplementary material

Supplementary material

APPENDIX-1: Literature Search Strategy

Databases & Registers	**# of initial hits**	**After deduplication**
Central (clinical trial register)	35	9
Embase	67	47
Medline	19	19
Scopus	29	2
Web of Science	28	8
Totals	178	85

Search strategies for the article appendix:

Cochrane Central Register of Controlled Trials (CCTR) via Ovid (1991+)):

#	**Query**	**Results from 25 Nov 2022**
1	((endoscopic adj2 (mucosectom* or resection* or dissection*)) or strip-biops*).ab,hw,ti.	1,735
2	((colo* or intestin* or bowel* or rect* or mucosa* or submucosa*) adj2 (polyp* or lesion* or growth*)).ab,hw,ti.	3,579
3	(underwater or submerge* or subaqu* or water or UEMR).ab,hw,ti.	35,092
4	1 and 2 and 3	40
5	limit 4 to english language	40
6	(neonat* or newborn* or infan* or toddler* or p?ediatric* or child* or girl* or boy* or adolesc* or teen* or youth).ti.	147,475
7	5 not 6	40
8	(random* or ((pragmatic or practical or equivalence or non-inferiority or noninferiority or superiority) adj3 (trial* or study or studies))).ab,hw,ti,pt.	1,177,155
9	((single or double or tripl* or trebl*) adj1 (blind* or mask*)).ab,hw,ti.	381,355
10	or/8-9	1,245,493
11	7 and 10	35

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Embase via Ovid (1974+):

#	Query	Results from 25 Nov 2022
1	endoscopic mucosal resection/	8,337
2	((endoscopic adj2 (mucosectom* or resection* or dissection*)) or strip-biops*).ab,kf,ti,dq.	27,630
3	or/1-2	29,748
4	exp intestine polyp/ or polyp/	56,321
5	((colo* or intestin* or bowel* or rect* or mucosa* or submucosa*) adj2 (polyp* or lesion* or growth*)).ab,kf,ti,dq.	66,551
6	or/4-5	105,057
7	3 and 6	5,856
8	water/ or water immersion/ or (underwater or submerge* or subaqu* or water or UEMR).ab,kf,ti,dq.	1,126,715
9	7 and 8	304
10	limit 9 to english language	294
11	exp juvenile/ not exp adult/	2,470,212
12	(exp animal/ or animal experiment/ or nonhuman/) not (exp human/ or human experiment/)	7,039,245
13	or/11-12	9,332,901
14	10 not 13	291
15	exp randomized controlled trial/ or exp "randomized controlled trial (topic)"/ or randomization/ or control group/ or double blind procedure/ or single blind procedure/ or triple blind procedure/	1,197,427
16	(random* or ((pragmatic or practical or equivalence or non-inferiority or noninferiority or superiority) adj3 (trial* or study or studies))).ab,kf,ti,dq,pt.	1,880,231
17	((single or double or tripl* or trebl*) adj1 (blind* or mask*)).ab,kf,ti,dq.	271,197
18	or/15-16	2,239,401
19	14 and 18	67

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MEDLINE via Ovid (1946+ and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) Daily):

#	Query	Results from 25 Nov 2022
1	Endoscopic Mucosal Resection/	3,211
2	((endoscopic adj2 (mucosectom* or resection* or dissection*)) or strip-biops*).ab,kf,ti.	15,199
3	or/1-2	15,627
4	polyps/ or intestinal polyps/	18,180
5	((colo* or intestin* or bowel* or rect* or mucosa* or submucosa*) adj2 (polyp* or lesion* or growth*)).ab,kf,ti.	46,332
6	or/4-5	61,566
7	3 and 6	1,899
8	Water/ or (underwater or submerge* or subaqu* or water or UEMR).ab,kf,ti.	986,344
9	7 and 8	96
10	limit 9 to english language	94
11	(exp infant/ or exp child/ or adolescent/) not exp adult/	2,092,365
12	exp animals/ not humans/	5,066,919
13	or/11-12	7,158,829
14	10 not 13	93
15	exp randomized controlled trial/ or exp Randomized Controlled Trials as Topic/ or Random Allocation/ or control groups/ or double-blind method/ or random allocation/ or single-blind method/	859,854
16	(random* or ((pragmatic or practical or equivalence or non-inferiority or noninferiority or superiority) adj3 (trial* or study or studies))).ab,kf,ti,pt.	1,511,166
17	((single or double or tripl* or trebl*) adj1 (blind* or mask*)).ab,kf,ti.	193,176
18	or/15-16	1,653,543
19	14 and 18	19

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Scopus via Elsevier (1823+):
(((TITLE-ABS-KEY((endoscopic W/2 (mucosectom* or resection* or dissection*)) or strip-biops*) AND TITLE-ABS-KEY((colo* or intestin* or bowel* or rect* or mucosa* or submucosa*) W/2 (polyp* or lesion* or growth*)) AND TITLE-ABS-KEY(underwater or submerge* or subaqu* or water or UEMR))) AND NOT (TITLE(neonat* or newborn* or infan* or toddler* or pediatric* or child* or girl* or boy* or adoles* or teen* or youth))) AND ((TITLE-ABS-KEY(random* or ((pragmatic or practical or equivalence or non-inferiority or noninferiority or superiority) W/3 (trial* or study or studies))) OR TITLE-ABS-KEY((single or double or tripl* or trebl*) W/1 (blind* or mask*)))) AND (LIMIT-TO (LANGUAGE,"English"))

Web of Science Core Collection via Clarivate Analytics (Science Citation Index Expanded 1975+ & Emerging Sources Citation Index 2015+):

#8	#6 AND #7
#7	TS=(random*) OR TS=((pragmatic or practical or equivalence or non-inferiority or noninferiority or superiority) NEAR/3 (trial* or study or studies)) OR TS=((single or double or tripl* or trebl*) NEAR/1 (blind* or mask*))
#6	#4 NOT #5 and English (Languages)
#5	TI=(neonat* or newborn* or infan* or toddler* or p?ediatric* or child* or girl* or boy* or adolesc* or teen* or youth)
#4	#1 AND #2 AND #3
#3	(underwater or submerge* or subaqu* or water or UEMR) (Topic)
#2	((colo* or intestin* or bowel* or rect* or mucosa* or submucosa*) NEAR/2 (polyp* or lesion* or growth*)) (Topic)
#1	endoscopic NEAR/2 (mucosectom* or resection* or dissection*) (Topic) or strip-biops* (Topic)

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APPENDIX-2: PRISMA Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	N/A
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	1-2
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	2
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	3
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	2-3
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	2-3
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	3-4
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	3-4

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Section and Topic	Item #	Checklist item	Location where item is reported
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	4-5
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	4-5
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	4-5
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	4-5
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	3-5
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	3-5
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	3-5
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	5
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	5
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	8-9
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	5
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	5

Supplementary material

Section and Topic	Item #	Checklist item	Location where item is reported
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	6
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	4-6
Study characteristics	17	Cite each included study and present its characteristics.	6
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	9
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	6-8
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	6-9
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	6-9
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	9
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	8-9
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	N/A
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	6-8
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	9-12

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Section and Topic	Item #	Checklist item	Location where item is reported
	23b	Discuss any limitations of the evidence included in the review.	12-13
	23c	Discuss any limitations of the review processes used.	12-13
	23d	Discuss implications of the results for practice, policy, and future research.	9-13
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	N/A
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	N/A
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	None.
Competing interests	26	Declare any competing interests of review authors.	None.
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Supplementary material

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372: n71. doi: 10.1136/bmj.n71 For more information, visit: http://www.prisma-statement.org/

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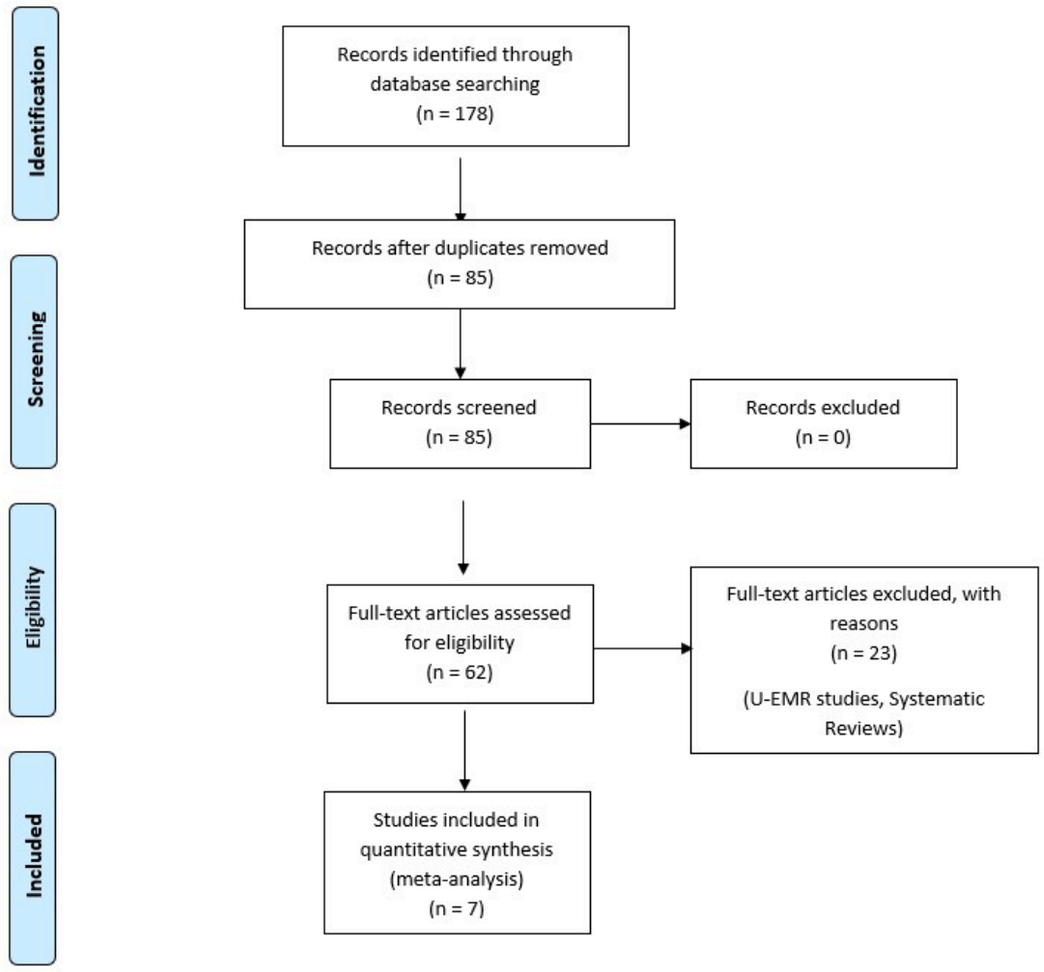
APPENDIX-3: Cochrane Collaboration tool to assess risk of bias

Sequence generation	Was the allocation sequence adequately generated?
Allocation concealment	Was allocation adequately concealed?
Blinding of participants, personnel and outcome assessors	Was knowledge of the allocated intervention adequately prevented during the study?
Incomplete outcome data	Were incomplete outcome data adequately addressed?
Selective outcome reporting	Are reports of the study free of suggestion of selective outcome reporting?
Other sources of bias	Was the study apparently free of other problems that could put it at a high risk of bias?

Supplementary material

Supplementary Figure 1: PRISMA Flow Diagram.



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

Supplementary material

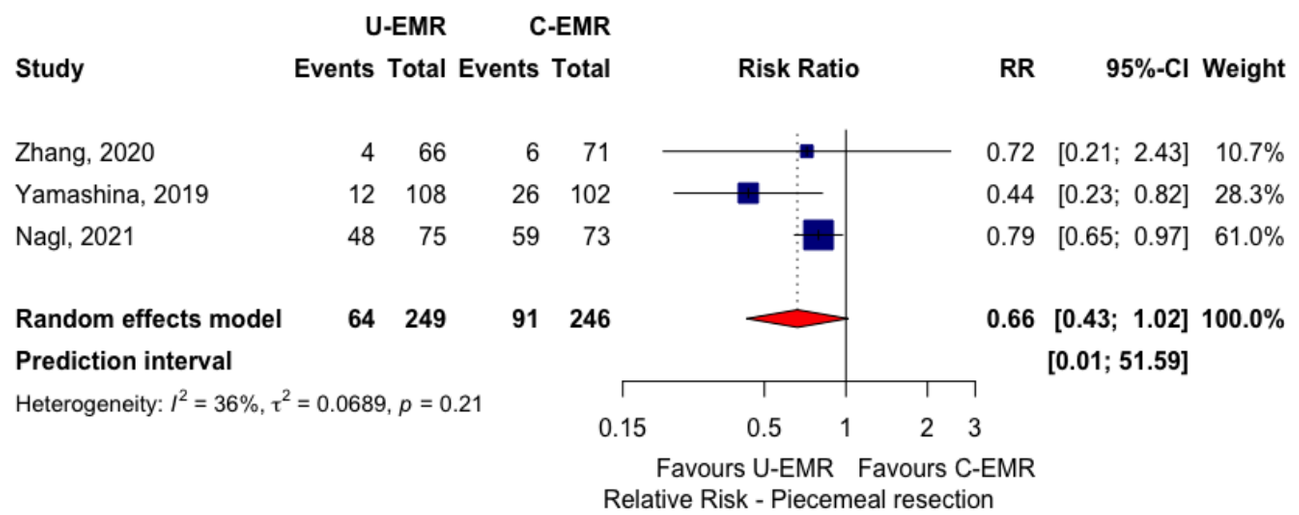
Supplementary Figure 2: Risk of bias assessment.

	Random Sequence Generation (Selection Bias)	Allocation Concealment (Selection Bias)	Blinding of Participants (Performance Bias)	Blinding of Outcome Assessment (Detection Bias)	Incomplete outcome Data (Attrition Bias)	Selective Reporting (Reporting Bias)
Zhang, 2020	+	+	+	-	+	+
Yen, 2020	+	+	+	-	+	+
Yamashina, 2019	+	+	+	-	+	+
Nagl, 2021	+	+	+	-	+	+
Lenz, 2022	+	+	N/A	N/A	+	+
Hamerski, 2019 (Abs)	+	+	N/A	N/A	+	+
Rodríguez Sánchez, 2022	+	+	+	-	+	+

Test	Outcome	Starting grade	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Overall Certainty of Evidence	Overall grade
Safety and Efficacy of Underwater versus Conventional Endoscopic Mucosal Resection for Colorectal Polyps - A Systematic Review & Meta-Analysis of Randomized Controlled Trials	Risk Ratio – R0 Resection	High	S	NS	NS	NS	None	Moderate (Grade B)	Moderate (Grade B)
	Risk Ratio – En-bloc Resection	High	S	NS	NS	NS	None	Moderate (Grade B)	
	Risk Ratio – Incomplete Resection	High	S	NS	NS	NS	None	Moderate (Grade B)	
	Risk Ratio – Piecemeal Resection	High	S	NS	NS	NS	None	Moderate (Grade B)	

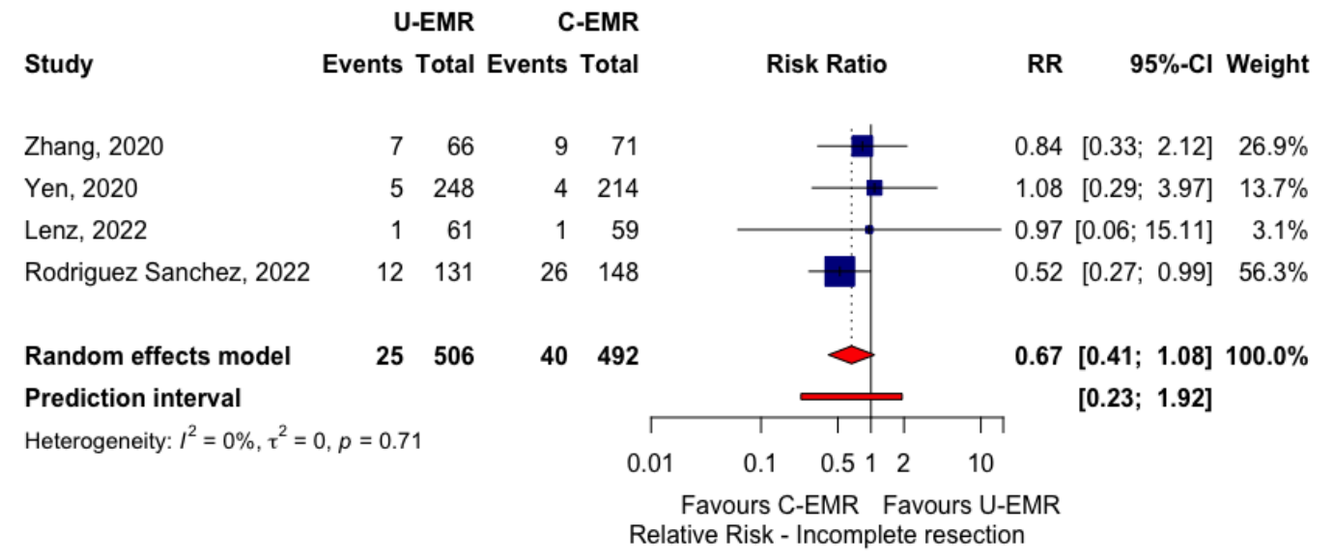
S- Serious, NS- Not Serious

Supplementary Figure 3: Forest plot, RR, piecemeal resection.

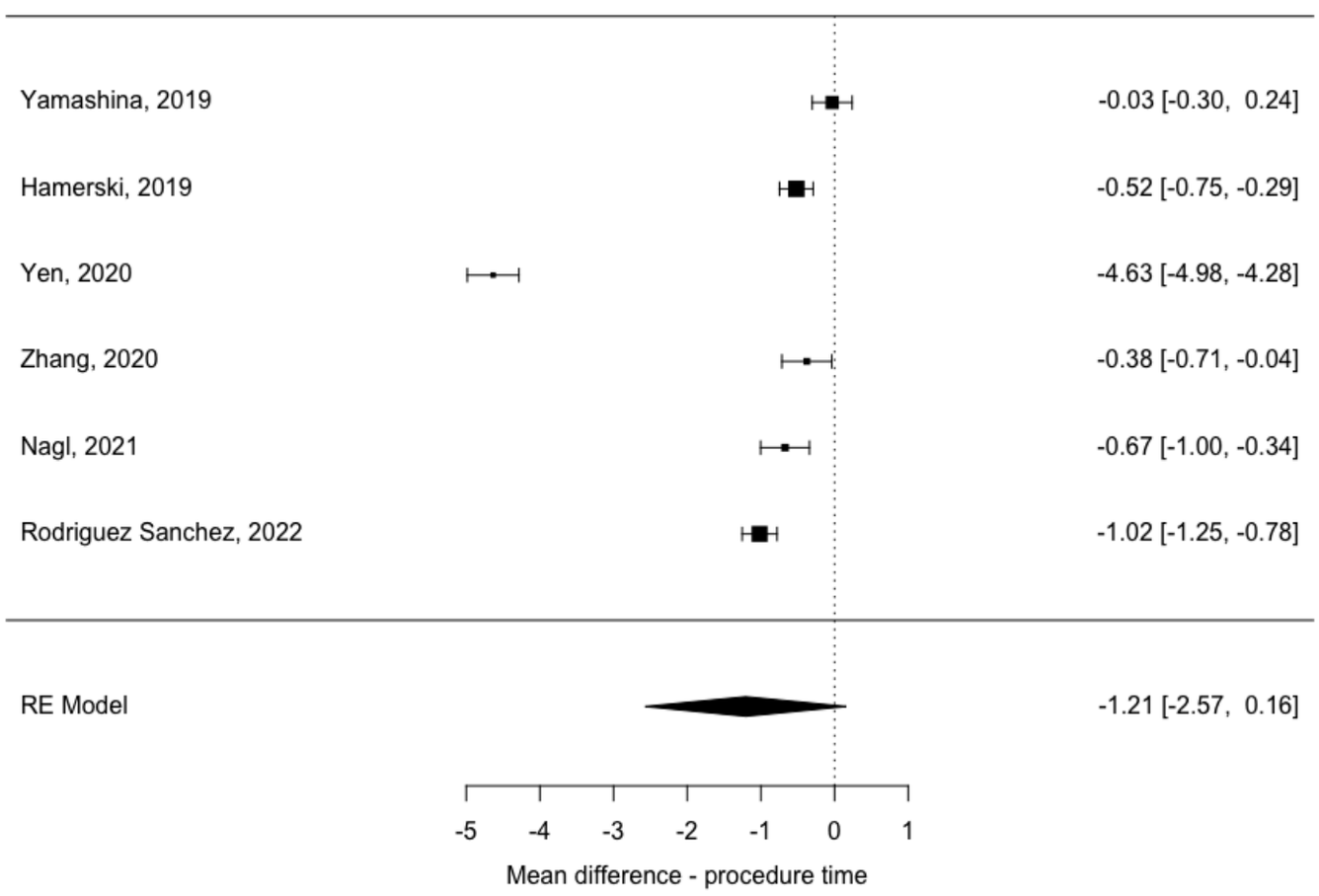


Supplementary material

Supplementary Figure 4: Forest plot, RR, incomplete resection.



Supplementary Figure 5: Forest plot, mean difference in resection time.



Supplementary material

Supplementary Figure(s) 6–8: Forest plot, RR, perforation, immediate and delayed bleeding.

Figure 6

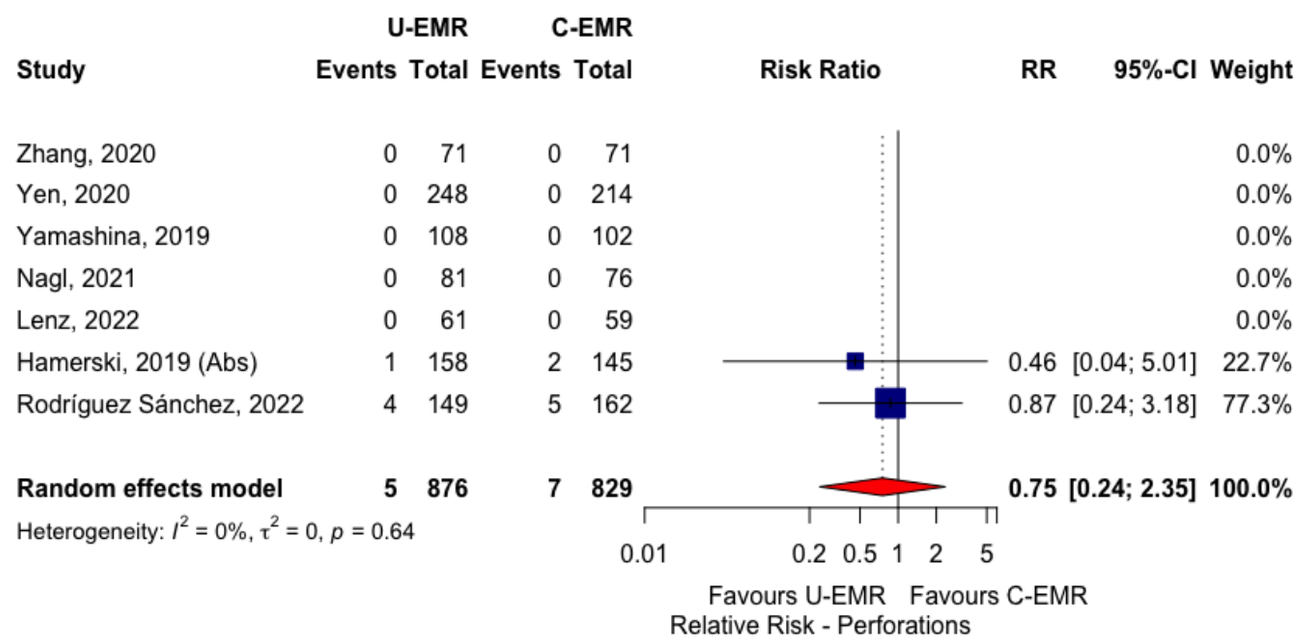


Figure 7

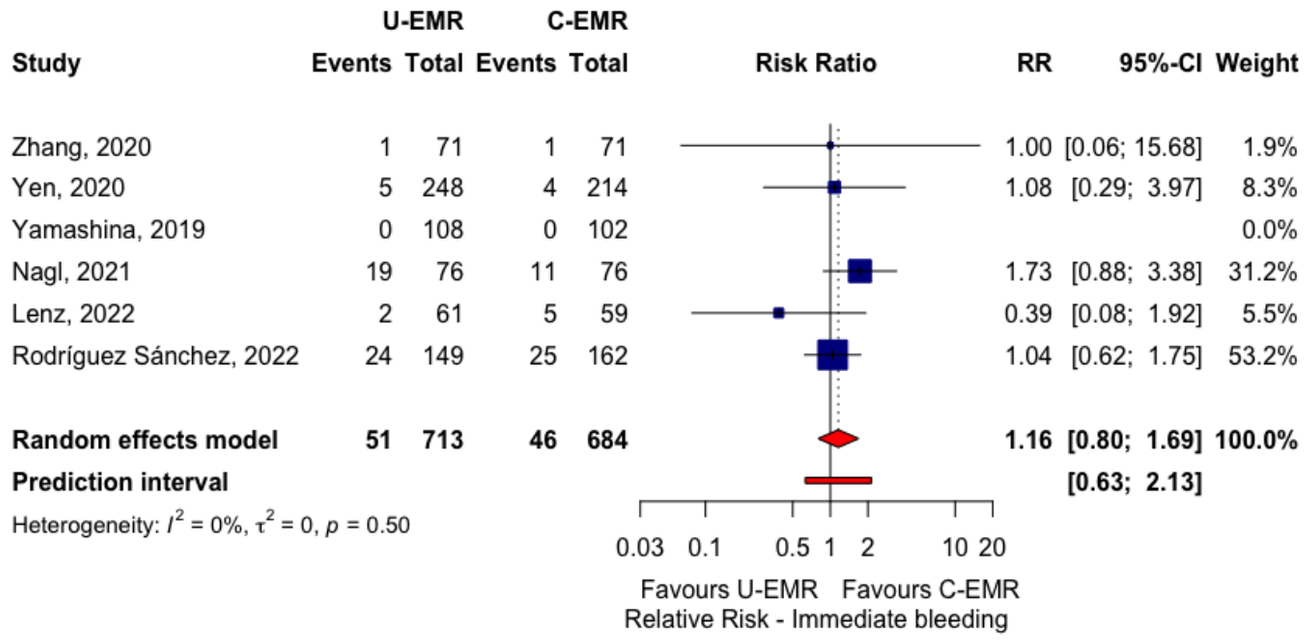


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Figure 8