

SUPPLEMENTAL DATA

META-ANALYSIS ARTICLE

An et al: Robotic, traditional, and endoscopic NSM

Comparison of robotic, conventional, and endoscopic nipple-sparing mastectomy with immediate prosthetic breast reconstruction for breast cancer: A systematic review and meta-analysis

Na An, Wenjuan Wang, Dandan Dai, Fei Yuan and Yufeng Zhang*

Department of Breast Diseases, Weifang People's Hospital, Weifang City, Shandong Province, China.

*Correspondence to Yufeng Zhang: NurseZhang2266@yeah.net.

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Table S1. Search syntax used in the relevant databases (Last updated June 15th, 2024).

Search number	Query	Results
15	((((((((Mammaplasty[Title/Abstract]) OR (Mammaplasty[Title/Abstract])) OR (Mammoplasty[Title/Abstract])) OR (Mammoplasties[Title/Abstract])) OR (Mastectomy[Title/Abstract])) OR (Mastectomies[Title/Abstract])) OR (Mammectomy[Title/Abstract])) OR (Mammectomies[Title/Abstract])) ((((((((Neoplasms[Title/Abstract]) OR (Neoplasm[Title/Abstract])) OR (Tumors[Title/Abstract])) OR (Tumor[Title/Abstract])) OR (Cancer[Title/Abstract])) OR (Cancers[Title/Abstract])) OR (Carcinoma[Title/Abstract])) OR (Carcinomas[Title/Abstract]))	OR
	((((((((Implantation[Title/Abstract]) OR (Reconstruction[Title/Abstract])) OR (Reconstructions[Title/Abstract])) OR (Flap[Title/Abstract])) OR (Flaps[Title/Abstract])) OR (Implantations[Title/Abstract])) OR (Reconstructive[Title/Abstract])) AND (((Breast[Title/Abstract]) OR (Mammary[Title/Abstract])) AND (((((((Endoscopy[Title/Abstract]) OR (Endoscopic[Title/Abstract])) OR (Robotic[Title/Abstract])) OR (Robotics[Title/Abstract])) OR (Robotically[Title/Abstract])) OR (Robot[Title/Abstract])) OR (Robots[Title/Abstract]))	1,779
16	((((((((Mammaplasty[Title/Abstract]) OR (Mammaplasty[Title/Abstract])) OR (Mammoplasty[Title/Abstract])) OR (Mammoplasties[Title/Abstract])) OR (Mastectomy[Title/Abstract])) OR (Mastectomies[Title/Abstract])) OR (Mammectomy[Title/Abstract])) OR (Mammectomies[Title/Abstract]))	OR 24

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((((((((((Neoplasms[Title/Abstract]) OR (Neoplasm[Title/Abstract])) OR
(Tumors[Title/Abstract])) OR (Tumor[Title/Abstract])) OR
(Cancer[Title/Abstract])) OR (Cancers[Title/Abstract])) OR
(Carcinoma[Title/Abstract])) OR (Carcinomas[Title/Abstract])) OR
((((((Implantation[Title/Abstract]) OR (Reconstruction[Title/Abstract]))
OR (Reconstructions[Title/Abstract])) OR (Flap[Title/Abstract])) OR
(Flaps[Title/Abstract])) OR (Implantations[Title/Abstract])) OR
(Reconstructive[Title/Abstract])) AND (((Breast[Title/Abstract]) OR
(Mammary[Title/Abstract])))) AND ((((((Endoscopy[Title/Abstract])
OR (Endoscopic[Title/Abstract])) OR (Robotic[Title/Abstract])) OR
(Robotics[Title/Abstract])) OR (Robotically[Title/Abstract])) OR
(Robot[Title/Abstract])) OR (Robots[Title/Abstract]))

((((((((Mammaplasty[Title/Abstract]) OR
(Mammaplasty[Title/Abstract])) OR (Mammoplasty[Title/Abstract])) OR
(Mammoplasties[Title/Abstract])) OR (Mastectomy[Title/Abstract])) OR
(Mastectomies[Title/Abstract])) OR (Mammectomy[Title/Abstract])) OR
(Mammectomies[Title/Abstract])) OR

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((((((((((Neoplasms[Title/Abstract]) OR (Neoplasm[Title/Abstract])) OR
(Tumors[Title/Abstract])) OR (Tumor[Title/Abstract])) OR
(Cancer[Title/Abstract])) OR (Cancers[Title/Abstract])) OR
(Carcinoma[Title/Abstract])) OR (Carcinomas[Title/Abstract])) OR
((((((Implantation[Title/Abstract]) OR (Reconstruction[Title/Abstract]))
OR (Reconstructions[Title/Abstract])) OR (Flap[Title/Abstract])) OR
(Flaps[Title/Abstract])) OR (Implantations[Title/Abstract])) OR
(Reconstructive[Title/Abstract])) AND (((Breast[Title/Abstract]) OR
(Mammary[Title/Abstract]))))

491,292

13

((((((((Mammaplasty[Title/Abstract]) OR
(Mammaplasty[Title/Abstract])) OR (Mammoplasty[Title/Abstract])) OR

33,120

	(Mammoplasties[Title/Abstract])) OR (Mastectomy[Title/Abstract])) OR (Mastectomies[Title/Abstract])) OR (Mammectomy[Title/Abstract])) OR (Mammectomies[Title/Abstract]))	
	(((((((((Neoplasms[Title/Abstract]) OR (Neoplasm[Title/Abstract])) OR (Tumors[Title/Abstract])) OR (Tumor[Title/Abstract])) OR (Cancer[Title/Abstract])) OR (Cancers[Title/Abstract])) OR (Carcinoma[Title/Abstract])) OR (Carcinomas[Title/Abstract])))) OR 12 (((((((Implantation[Title/Abstract]) OR (Reconstruction[Title/Abstract])) 484,373 OR (Reconstructions[Title/Abstract])) OR (Flap[Title/Abstract])) OR (Flaps[Title/Abstract])) OR (Implantations[Title/Abstract])) OR (Reconstructive[Title/Abstract])))) AND (((Breast[Title/Abstract]) OR (Mammary[Title/Abstract]))))	
	(((((((((Neoplasms[Title/Abstract]) OR (Neoplasm[Title/Abstract])) OR (Tumors[Title/Abstract])) OR (Tumor[Title/Abstract])) OR (Cancer[Title/Abstract])) OR (Cancers[Title/Abstract])) OR 11 (Carcinoma[Title/Abstract])) OR (Carcinomas[Title/Abstract])))) OR 4,307,374 (((((((Implantation[Title/Abstract]) OR (Reconstruction[Title/Abstract])) OR (Reconstructions[Title/Abstract])) OR (Flap[Title/Abstract])) OR (Flaps[Title/Abstract])) OR (Implantations[Title/Abstract])) OR (Reconstructive[Title/Abstract]))	
10	((Breast[Title/Abstract]) OR (Mammary[Title/Abstract]))	598,998
	(((((((((Neoplasms[Title/Abstract]) OR (Neoplasm[Title/Abstract])) OR (Tumors[Title/Abstract])) OR (Tumor[Title/Abstract])) OR 9 (Cancer[Title/Abstract])) OR (Cancers[Title/Abstract])) OR 3,800,281 (Carcinoma[Title/Abstract])) OR (Carcinomas[Title/Abstract]))	
7	((((((Implantation[Title/Abstract]) OR (Reconstruction[Title/Abstract])) OR (Reconstructions[Title/Abstract])) OR (Flap[Title/Abstract])) OR	573,060

		(Flaps[Title/Abstract])) OR (Implantations[Title/Abstract])) OR (Reconstructive[Title/Abstract])	
		((((((Endoscopy[Title/Abstract]) OR (Endoscopic[Title/Abstract])) OR (Robotic[Title/Abstract])) OR (Robotics[Title/Abstract])) OR (Robotically[Title/Abstract])) OR (Robot[Title/Abstract])) OR (Robots[Title/Abstract])	326,086
	3		
	2	Robots[Title/Abstract]	13,020
		((((((Endoscopy[Title/Abstract]) OR (Endoscopic[Title/Abstract])) OR (Robotic[Title/Abstract])) OR (Robotics[Title/Abstract])) OR (Robotically[Title/Abstract])) OR (Robot[Title/Abstract])	322,192
	1		
	#9	#1 AND #8	3282
	#8	#3 OR #7	705033
	#7	#4 AND #6	696444
	#6	#2 OR #5	5891875
		neoplasm:ti,ab,kw OR neoplasms:ti,ab,kw OR tumor:ti,ab,kw OR tumors:ti,ab,kw OR cancer:ti,ab,kw OR cancers:ti,ab,kw OR carcinoma:ti,ab,kw OR carcinomas:ti,ab,kw	5227088
Embase	#5		
	#4	breast:ti,ab,kw OR mammary:ti,ab,kw	834404
		mammaplasty:ti,ab,kw OR mammaplasties:ti,ab,kw OR mammoplasty:ti,ab,kw OR mammoplasties:ti,ab,kw OR mastectomy:ti,ab,kw OR mastectomies:ti,ab,kw OR mammectomy:ti,ab,kw OR mammectomies:ti,ab,kw	49061
	#3		

		implantation:ti,ab,kw OR implantations:ti,ab,kw OR	
	#2	reconstruction:ti,ab,kw OR reconstructions:ti,ab,kw OR flap:ti,ab,kw OR flaps:ti,ab,kw OR reconstructive:ti,ab,kw	761558
		endoscopy:ti,ab,kw OR endoscopic:ti,ab,kw OR robotic:ti,ab,kw OR	
	#1	robotics:ti,ab,kw OR robot:ti,ab,kw OR robots:ti,ab,kw OR robotically:ti,ab,kw	517340
	#1	TS=(Endoscopy) OR TS=(Endoscopic) OR TS=(Robotic) OR TS=(Robotics) OR TS=(Robot) OR TS=(Robots) OR TS=(Robotically)	695022
		TS=(Neoplasm) OR TS=(Neoplasms) OR TS=(Tumor) OR TS=(Tumors) OR TS=(Cancer) OR TS=(Cancers) OR TS=(Carcinoma) OR	
	#2	TS=(Carcinomas) OR TS=(Implantation) OR TS=(Implantations) OR TS=(Reconstruction) OR TS=(Reconstructions) OR TS=(Flap) OR TS=(Flaps)	5895781
Web of science		TS=(Mammaplasty) OR TS=(Mammaplasties) OR TS=(Mammoplasty) OR TS=(Mammoplasties) OR TS=(Mastectomy) OR TS=(Mastectomies) OR TS=(Mammectomy) OR TS=(Mammectomies)	40020
	#4	TS=(Breast) OR TS=(Mammary)	960153
	#5	#4 AND #2	799871
	#6	#5 OR #3	807926
	#7	#1 AND #6	2925
	#1	(Endoscopy):ti,ab,kw OR (Endoscopic):ti,ab,kw OR (Robotic):ti,ab,kw OR (Robotics):ti,ab,kw OR (Robot):ti,ab,kw	39868
Cochrane			
ne			495
	#2	(Robots):ti,ab,kw OR (Robotically):ti,ab,kw	

#3	(Breast):ti,ab,kw OR (Mammary):ti,ab,kw	62261
#4	(Neoplasm):ti,ab,kw OR (Neoplasms):ti,ab,kw OR (Tumor):ti,ab,kw OR (Tumors):ti,ab,kw OR (Cancer):ti,ab,kw	261242
#5	(Cancers):ti,ab,kw OR (Carcinoma):ti,ab,kw OR (Carcinomas):ti,ab,kw OR (Implantation):ti,ab,kw OR (Implantations):ti,ab,kw	86342
#6	(Reconstruction):ti,ab,kw OR (Reconstructions):ti,ab,kw OR (Flap):ti,ab,kw OR (Flaps):ti,ab,kw OR (Reconstructive):ti,ab,kw	17911
#7	(Mammaplasty):ti,ab,kw OR (Mammaplasties):ti,ab,kw OR (Mammoplasty):ti,ab,kw OR (Mammoplasties):ti,ab,kw OR (Mastectomy):ti,ab,kw	6994
#8	(Mastectomies):ti,ab,kw OR (Mammectomy):ti,ab,kw OR (Mammectomies):ti,ab,kw	181
#9	#4OR#5OR#6	307780
#10	#3AND#9	48842
#11	#7OR#8	7034
#12	#10OR#11	49873
#13	#1OR#2	39938
#14	#12AND#13	157

Table S2. Newcastle–Ottawa Scale (NOS) for cohort study.

Study	I	II	III	IV	V	VI	VII	VIII	Total
Houvenaeghel2021	0	1	1	1	2	1	1	1	8
Lee2021	0	1	1	1	2	1	0	1	7
Moon2021	0	1	1	1	2	1	0	1	7
Park2022	1	1	1	1	0	1	1	1	7
Wang2023	0	1	1	1	2	1	1	0	7
Qiu20222	0	1	1	1	2	1	0	0	6

Note: Numbers I-VIII in heading signified: I, representatives of the exposed cohort; II, selection of the non-exposed cohort; III, ascertainment of exposure; IV, demonstration that outcome of interest was present at the start of the study; V, comparability of cohorts on the basis of the design or analysis; VI, assessment of the outcome; VII, was follow-up long enough for outcomes to occur? VIII, adequacy of follow-up of cohorts.

Table S3. Methodological items for non-randomized study.

Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Total
Lai2014	2	2	2	2	0	2	2	2	0	2	2	2	20

Note: Q1, A clearly stated aim: the question addressed should be precise and relevant in the light of available literature

Q2, Inclusion of consecutive patients: all patients potentially fit for inclusion (satisfying the criteria for inclusion) have been included in the study during the study period (no exclusion or details about the reasons for exclusion)

Q3, Prospective collection of data: data were collected according to a protocol established before the beginning of the study

Q4, Endpoints appropriate to the aim of the study: unambiguous explanation of the criteria used to evaluate the main outcome

which should be in accordance with the question addressed by the study. Also, the endpoints should be assessed on an intention-to-treat basis.

Q5, Unbiased assessment of the study endpoint: blind evaluation of objective endpoints and double-blind evaluation of subjective endpoints. Otherwise the reasons for not blinding should be stated

Q6, Follow-up period appropriate to the aim of the study: the follow-up should be sufficiently long to allow the assessment of the main endpoint and possible adverse events

Q7, Loss to follow up less than 5%: all patients should be included in the follow up. Otherwise, the proportion lost to follow up should not exceed the proportion experiencing the major endpoint

Q8, Prospective calculation of the study size: information of the size of detectable difference of interest with a calculation of 95% confidence interval, according to the expected incidence of the outcome event, and information about the level for statistical significance and estimates of power when comparing the outcomes

Q9, An adequate control group: having a gold standard diagnostic test or therapeutic intervention recognized as the optimal

intervention according to the available published data

Q10, Contemporary groups: control and studied group should be managed during the same time period (no historical comparison)

Q11, Baseline equivalence of groups: the groups should be similar regarding the criteria other than the studied endpoints. Absence

of confounding factors that could bias the interpretation of the results

Q12, Adequate statistical analyses: whether the statistics were in accordance with the type of study with calculation of confidence intervals or relative risk

Table S4. Jadad scale for randomized controlled trial.

Study	I1	I2	I3	I4	Total
Toesca 2022	2	0	0	1	3

Note: Numbers I1-I3 in heading signified: I1, Was the study randomized? I2, Was the randomization hidden? I3, Was the study double-blind? I4, Was there any treatment for withdrawals and missed visits?

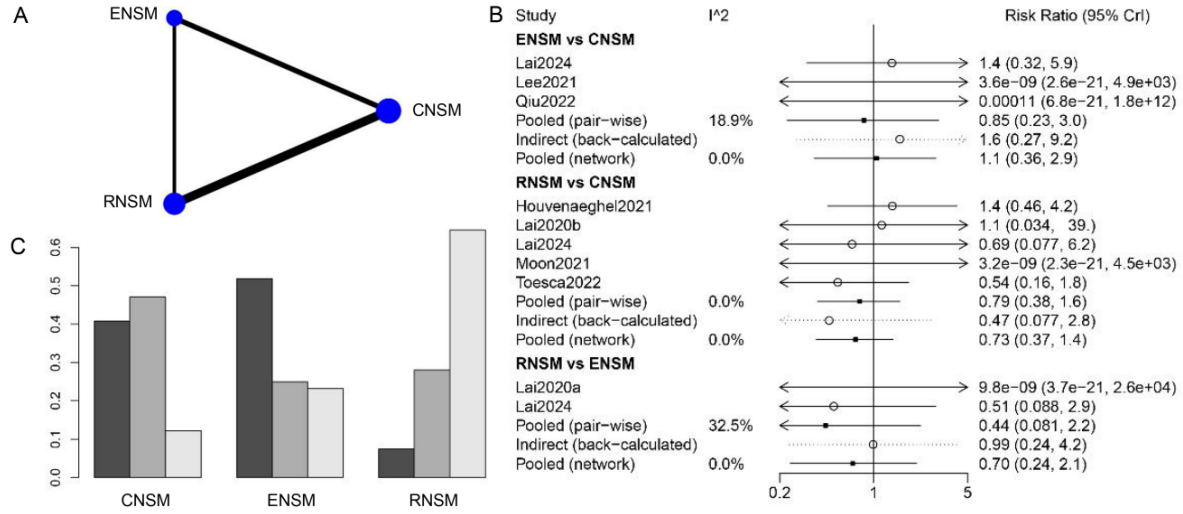
Table S5. Newcastle–Ottawa Scale (NOS) for Case-control study.

Study	I	II	III	IV	V	VI	VII	VIII	Total
Lai ^a 2020	1	0	0	1	2	1	1	1	7
Lai ^b 2020	1	0	0	1	2	1	1	0	6

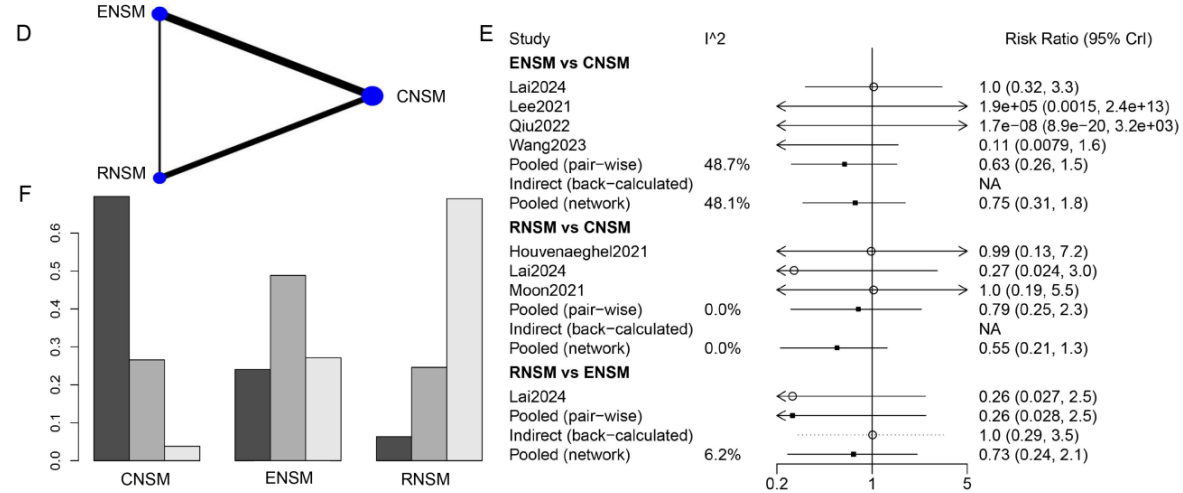
Note: Numbers I-VIII in heading signified: I, Is the case definition adequate; II, Representativeness of the cases; III, Selection of Controls; IV, Definition of Controls; V, Comparability of cases and controls on the basis of the design or analysis; VI, Ascertainment

of exposure; VII, Same method of ascertainment for cases and controls; VIII, Non-Response rate.

Hematoma



Infection



Implant loss

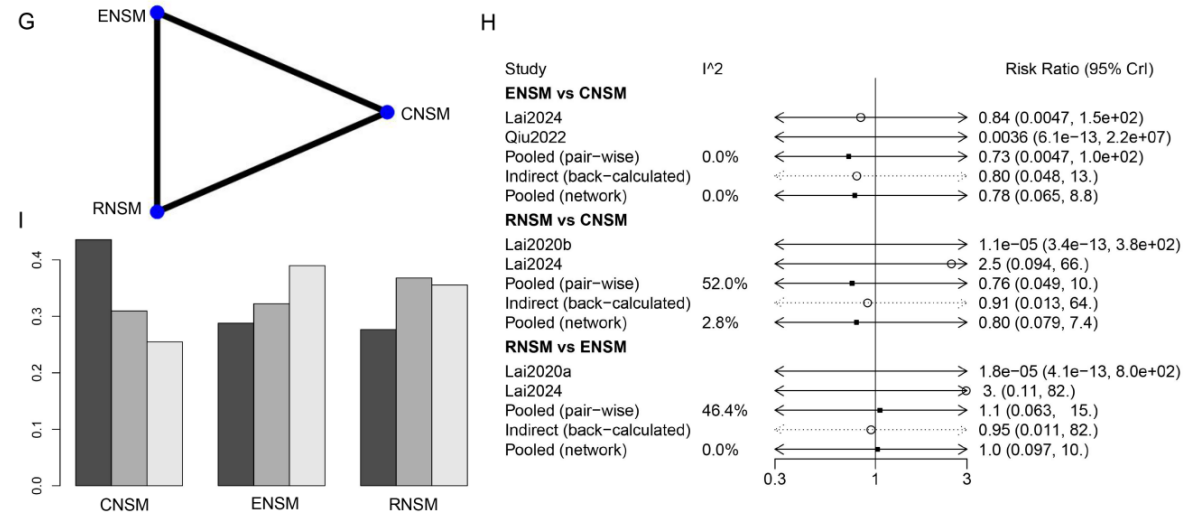


Figure S1. Meta-analysis results of complication (hematoma, infection and implant loss). **A, D, G,** Network diagram; **B, E, H,** Forest plot; **C, F, I,** Sorting probability graph.