Supplementary File

Contents

Table S1. Search strategy and literature search results.

Database	Restrictions	Access date	Search strategy	No of results
PubMed	**All field**	**20/4/2025**	(Cholelithiases OR Gallstone Disease OR Gallstone Diseases OR Cholelithiasis OR Common Bile Duct) AND (Laparoscopic Cholecystectomy OR Laparoscopic Cholecystectomies OR Celioscopic Cholecystectomies OR Celioscopic Cholecystectomy OR LC) AND (Endoscopic Retrograde Cholangiopancreatographies OR Endoscopic Retrograde Cholangiopancreatography OR ERCP OR Laparoendoscopic rendezvous OR LERV)	**2153**
Cochrane	**Title/Abstract/keyword**	**20/4/2025**		**2338**
Scopus	**Title/Abstract/keyword**	**20/4/2025**		**2449**
WOS	**All field**	**20/2/2025**		**1409**
Total				**8,349**

Table S2. Quality Assessment of Included Non-Randomized Studies Using the Newcastle–Ottawa Scale (NOS)

study ID	Selection				Comparability		outcome			Total
	1. Representativeness of the exposed cohort	2. Selection of the non-exposed cohort	3. Ascertainment of exposure	4. Demonstration that the outcome was not present at the start	1. Comparability of cohorts based on design or analysis	Controls for the most important confounders and any additional confounders.	1. Assessment of outcome	2. Follow-up long enough for outcomes to occur	3. Adequacy of follow-up	
Garbarini 2016	*	*	*	*	*	*	*	*	*	9/9
Gerosa 2024	*	*	*	*	*		*	*	*	8/9
Hu 2017	*	*	*	*	*		*	*		7/9
Di Lascia,2021	*	*	*	*	*	*	*	*	*	9/9
Lv 2023	*		*	*	*		*	*	*	8/9
Meyer 1999	*	*	*	*	*		*			6/9
Muhammedoğlu 2019	*	*	*	*	*		*	*	*	8/9
Passi 2017	*	*	*	*	*	*	*	*	*	9/9
Qian 2019	*	*	*	*	*	*	*	*	*	9/9
Percario 2025	*	*	*	*	*		*	*		8/9
raab2024	*	*	*	*	*	*	*	*	*	9/9
Jiang, 2011	*	*	*	*	*		*	*		7/9
graca 2007	*	*	*	*	*	*	*	*	*	9/9
Mohamed, 2023	*	*	*	*	*		*	*	*	8/9

* Total score ranges from 0 to 9 points, with higher scores indicating better methodological quality.

Table S3. GRADE Certainty Assessment for the Success Rate of Common Bile Duct Clearance

Certainty assessment							№ of patients		Effect		Certainty
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	one stage	two stages	Relative (95% CI)	Absolute (95% CI)	
Success rate of CBD clearance in RCT											
9	randomized trials	not serious	not serious	not serious	Serious [a]	none	423/445 (95.1%)	408/448 (91.1%)	**RR 1.03** (0.99 to 0.07)	**27 more per 1,000** (from 847 fewer to 9 fewer)	⨁⨁⨁◯ Moderate
Success rate of CBD clearance in retrospective studies											
12	non-randomized studies	not serious	not serious	not serious	not serious	none	956/984 (97.2%)	1043/1132 (92.1%)	**RR 1.03** (1.01 to 1.04)	**28 more per 1,000** (from 9 more to 37 more)	⨁⨁◯◯ Low
								0.0%		**0 fewer per 1,000** (from 0 fewer to 0 fewer)	

CI: confidence interval; **RR:** risk ratio

Explanations

a. Confidence interval includes both benefit and harm

Summary of findings:

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)
	Risk with two stages	**Risk with one stage**			
Success rate of CBD clearance in RCT	911 per 1,000	**938 per 1,000** (64 to 902)	**RR 1.03** (0.99 to 0.07)	893 (9 RCTs)	⊕⊕⊕◯ Moderate [a]
Success rate of CBD clearance in retrospective studies	**Study population**		**RR 1.03** (1.01 to 1.04)	2116 (12 non-randomized studies)	⊕⊕◯◯ Low
	921 per 1,000	**949 per 1,000** (931 to 958)			
	Low				
	0 per 1,000	**0 per 1,000** (0 to 0)			

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: confidence interval; **RR:** risk ratio

GRADE Working Group grades of evidence
High certainty: We are very confident that the true effect lies close to that of the estimated effect.
Moderate certainty: we are moderately confident in the effect estimate; the true effect is likely to be close to the estimate, but it may be substantially different.
Low certainty: our confidence in the effect estimate is limited; the true effect may be substantially different from the estimate.
Very low certainty: we have very little confidence in the effect estimate; the true effect is likely to be substantially different from the estimated effect.

Explanations
a. Confidence interval includes both benefit and harm

CI: confidence interval; RR: risk ratio; RCT: randomized controlled trial; CBD: common bile duct; GRADE: Grading of Recommendations Assessment, Development and Evaluation.

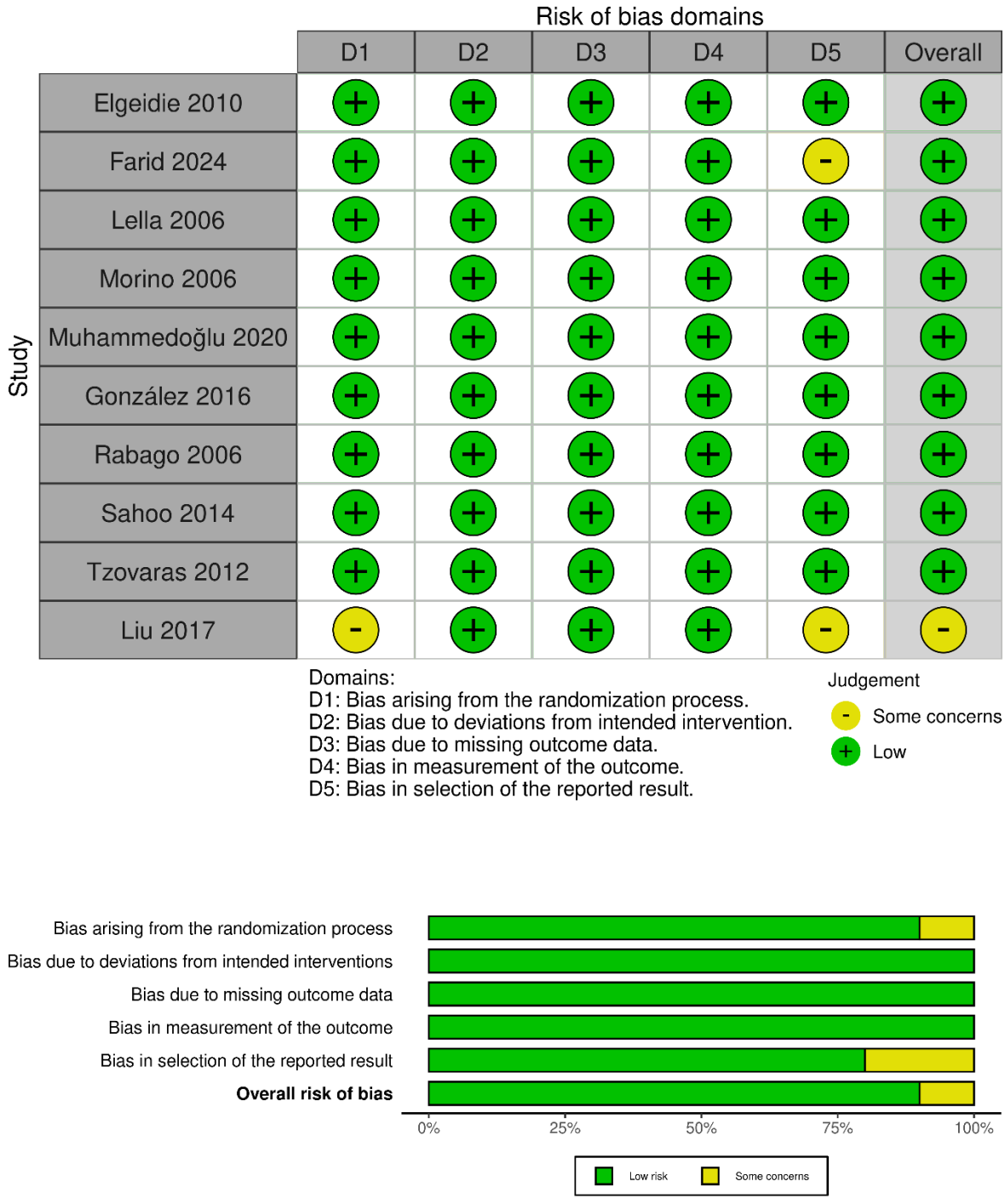

Fig 1. Risk of bias in our included studies

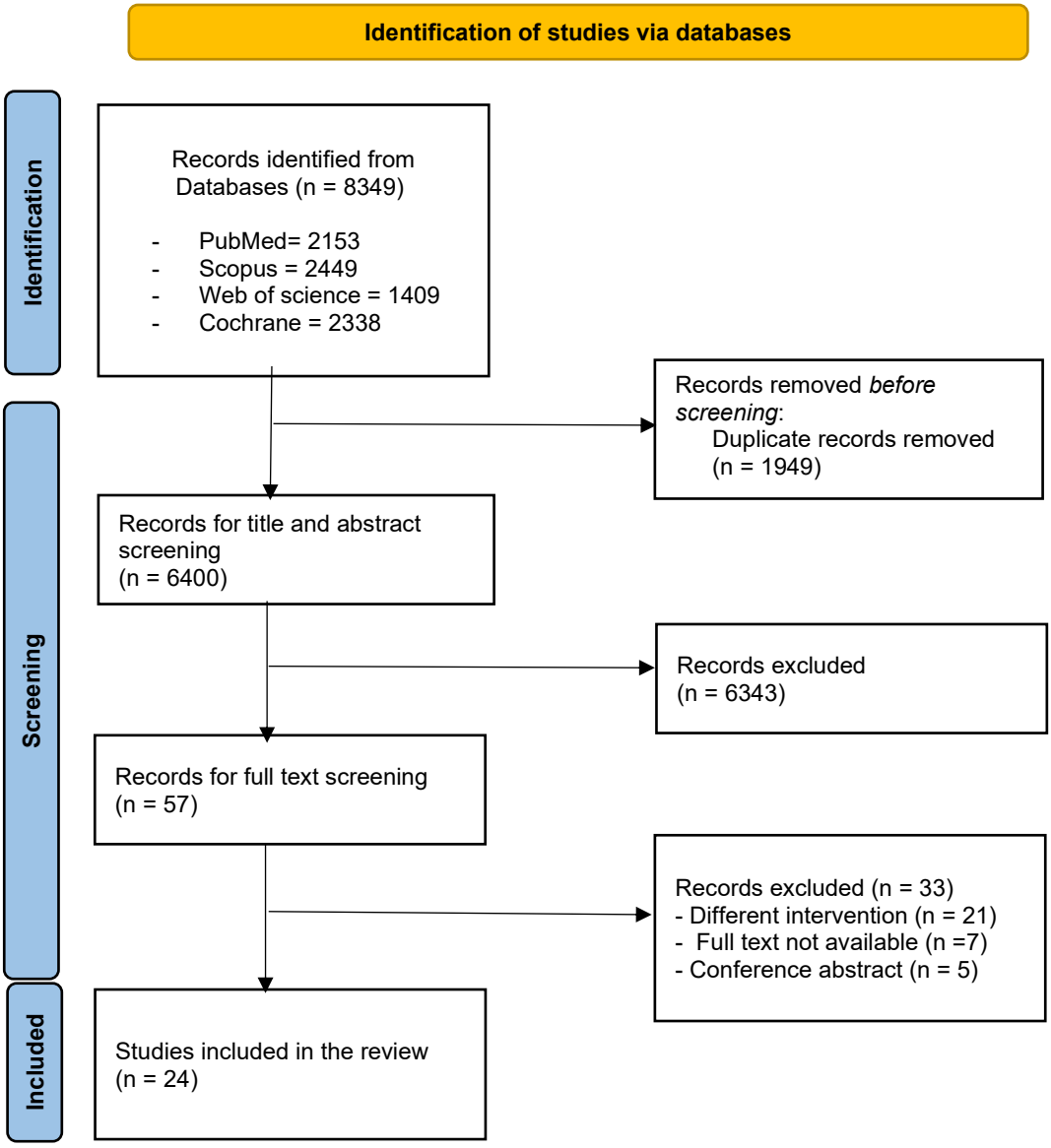

Fig. 2 PRISMA flow diagram

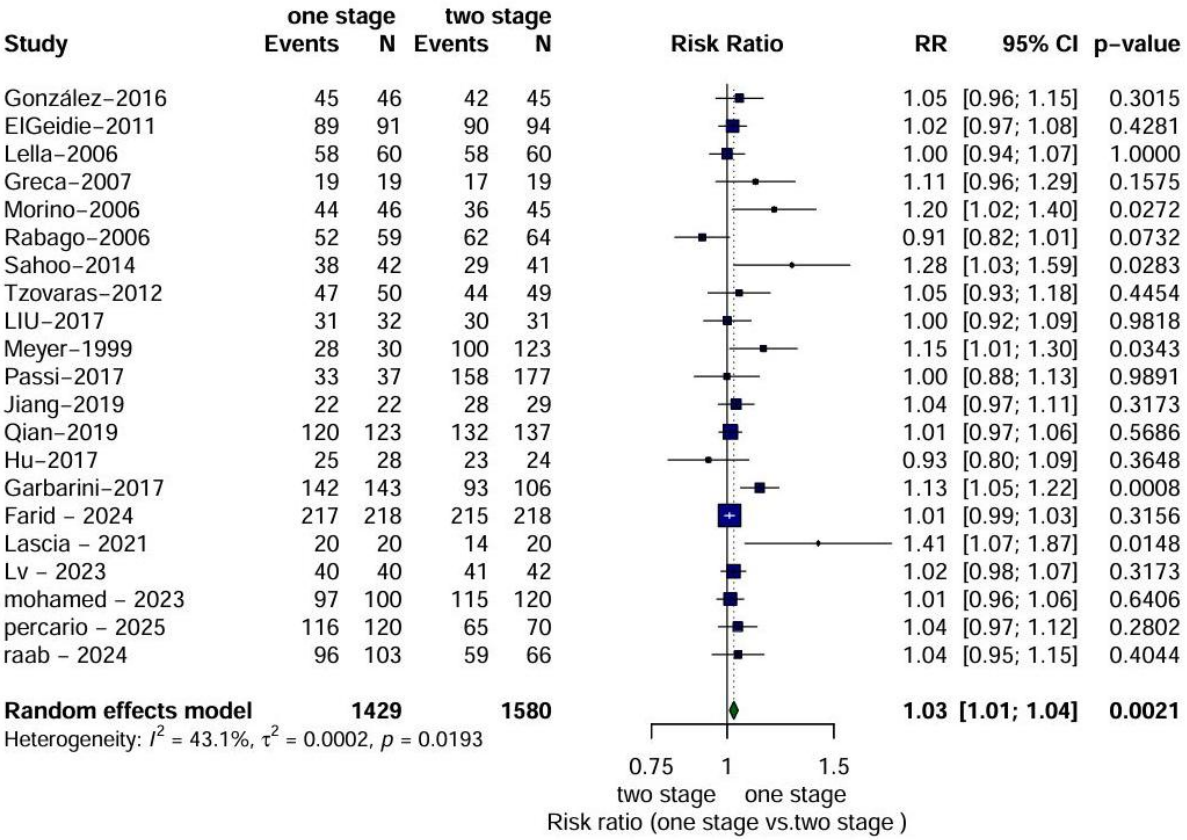

Fig. 3 Forest plot of the success rate of CBD clearance

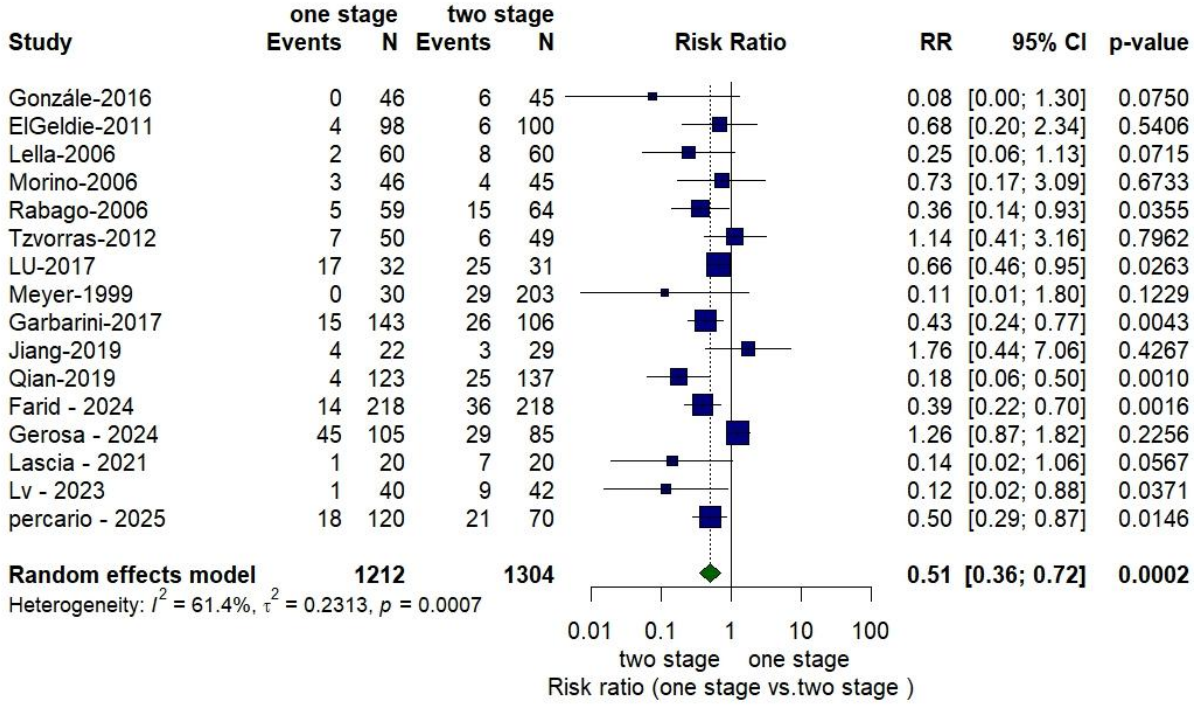

Fig. 4 Forest plot of overall complication rate

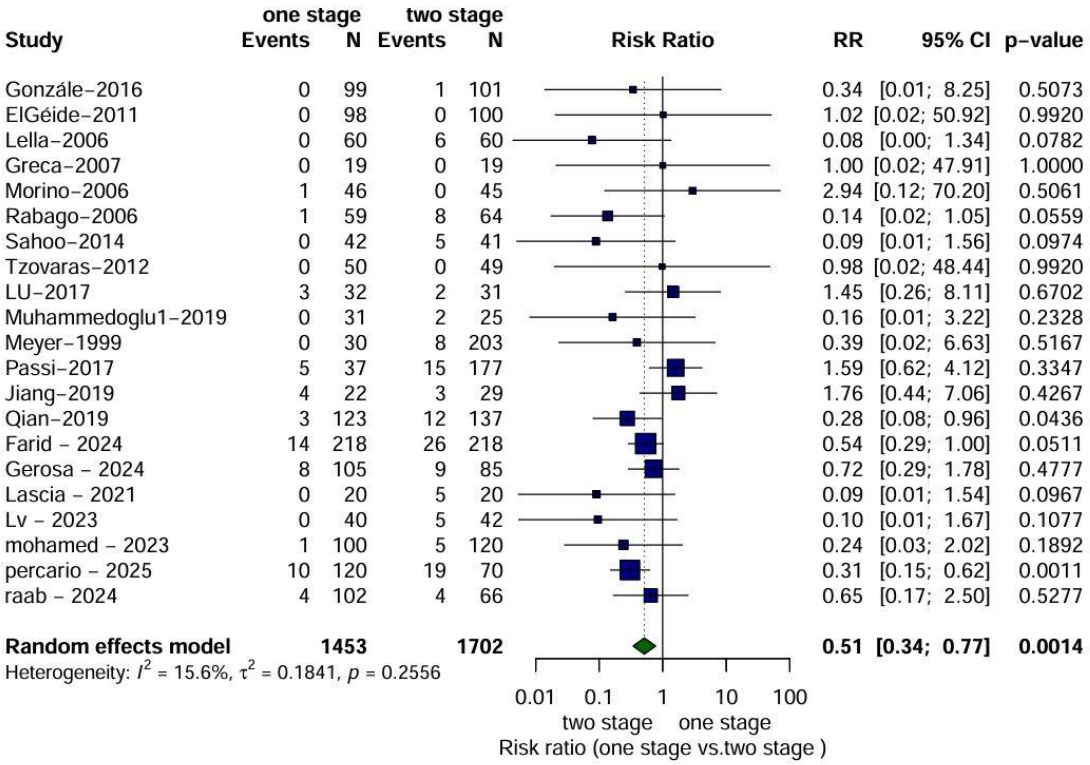

Fig. 5 Forest plot of post-operative pancreatitis

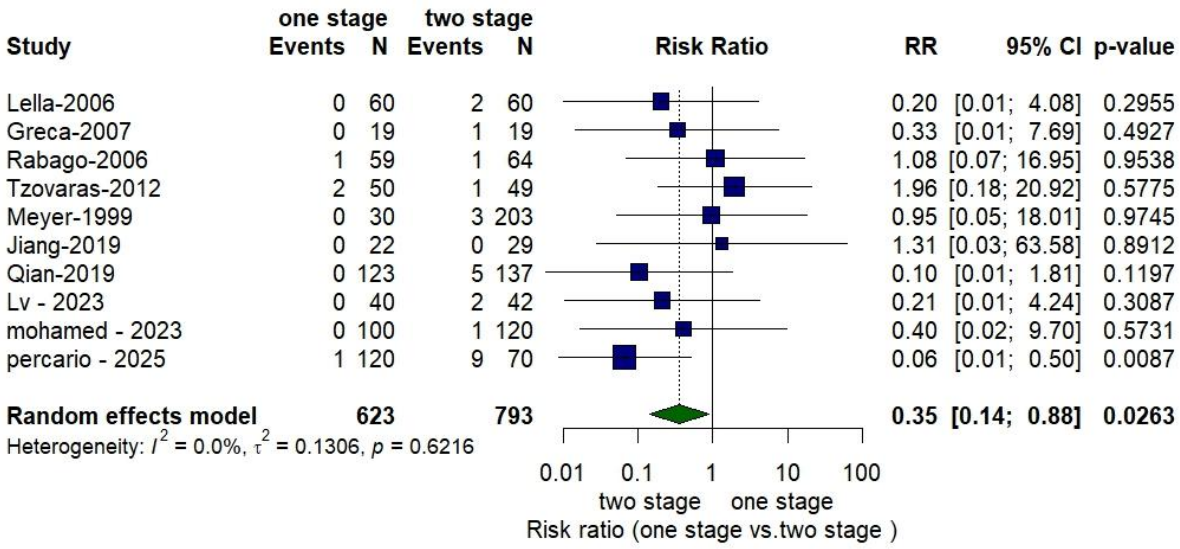

Fig. 6 Forest plot of post-operative cholangitis

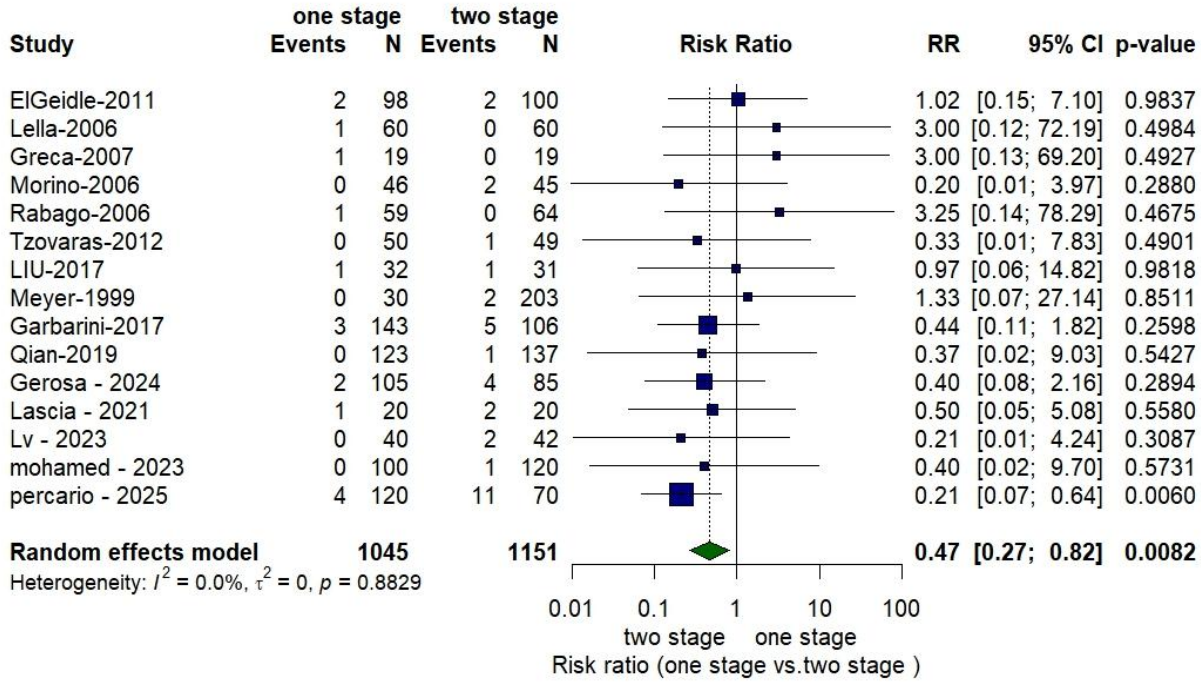

Fig. 7 Forest plot of post-operative bleeding

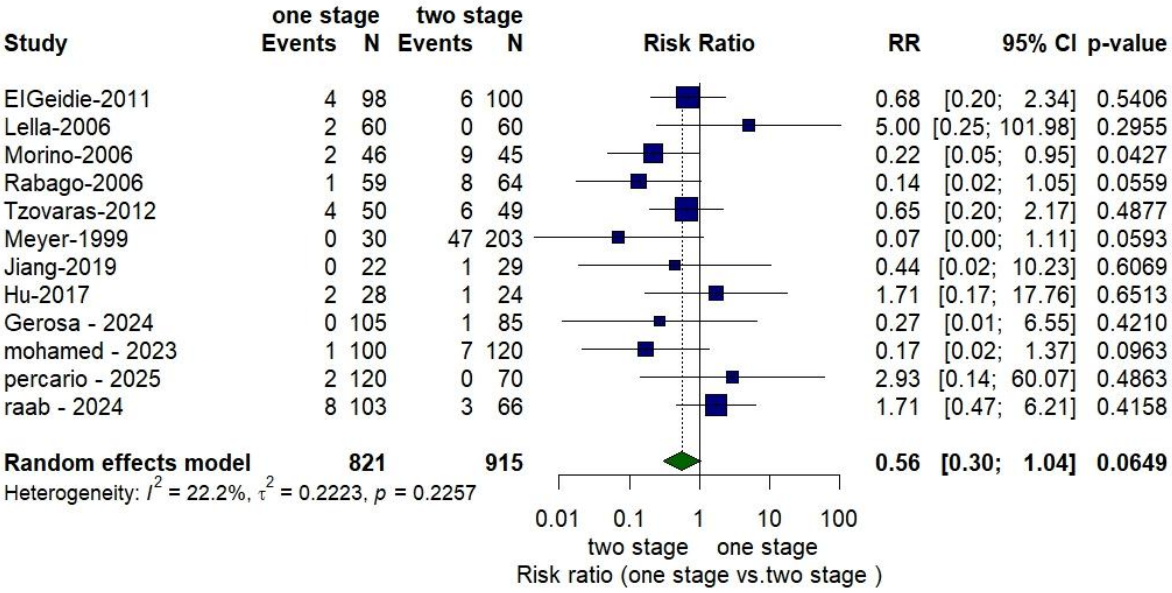

Fig. 8 Forest plot of operation conversion rate

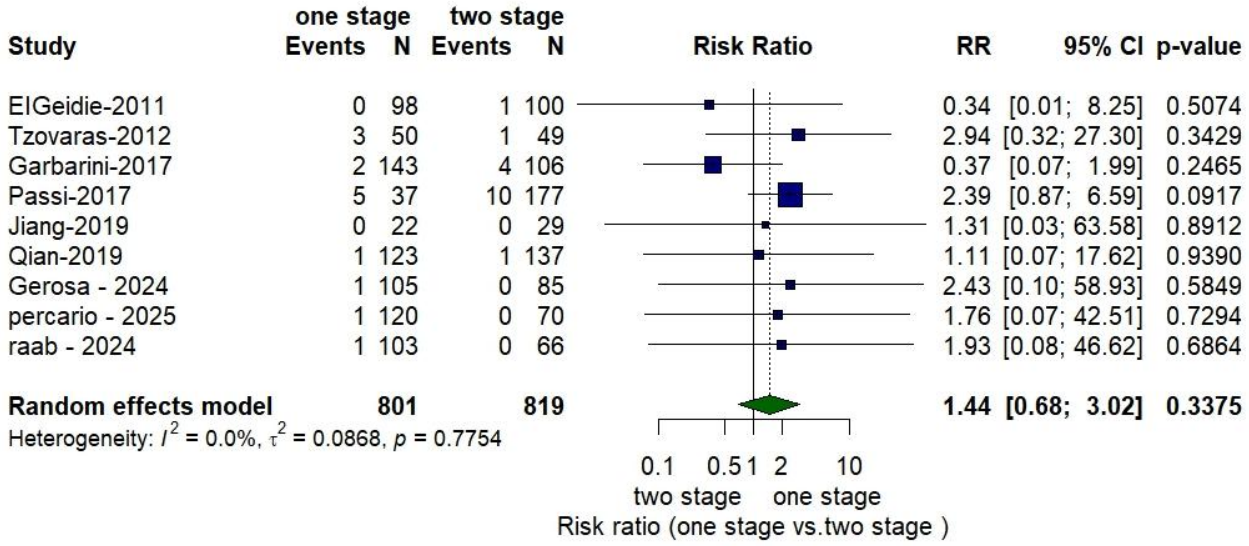

Fig. 9 Forest plot of bile leak

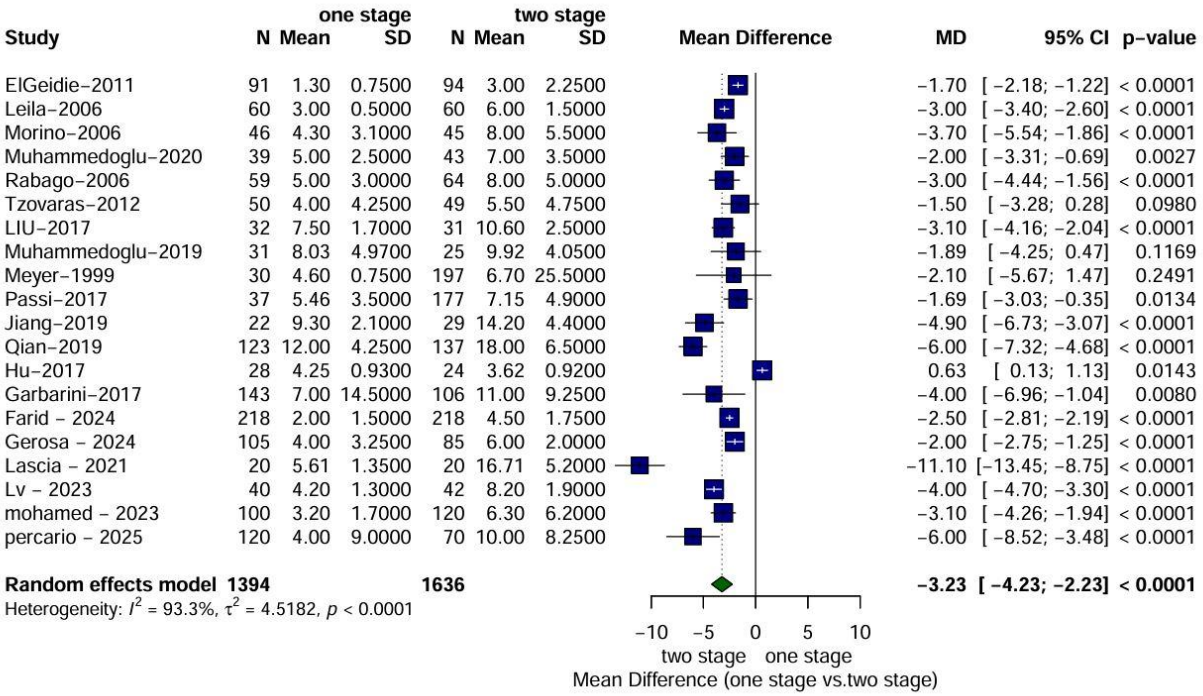

Fig. 10 Forest plot of the length of hospital stay

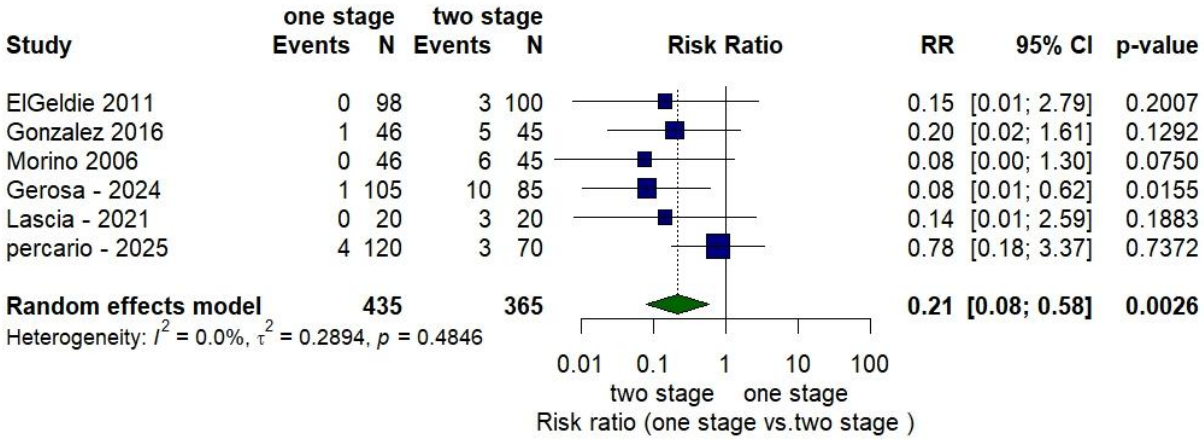

Fig. 11 Forest plot of postoperative second ERCP

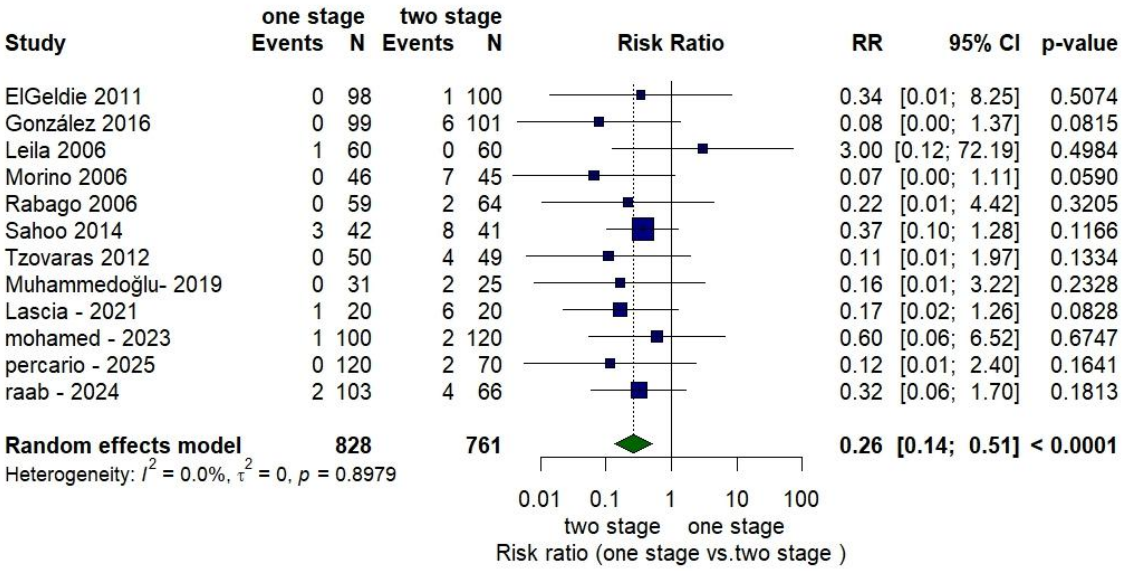

Fig. 12 Forest plot of cannulation failure rate

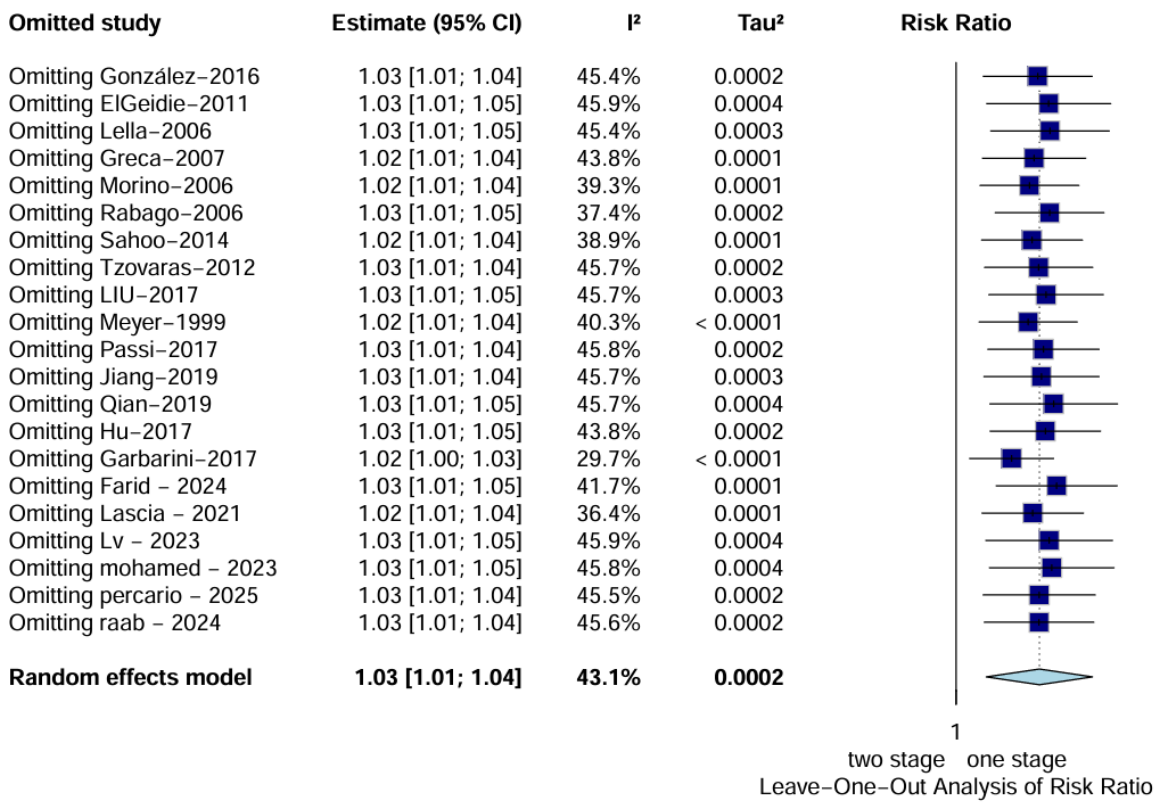

Fig. 13 Sensitivity analysis of the success rate of CBD clearance

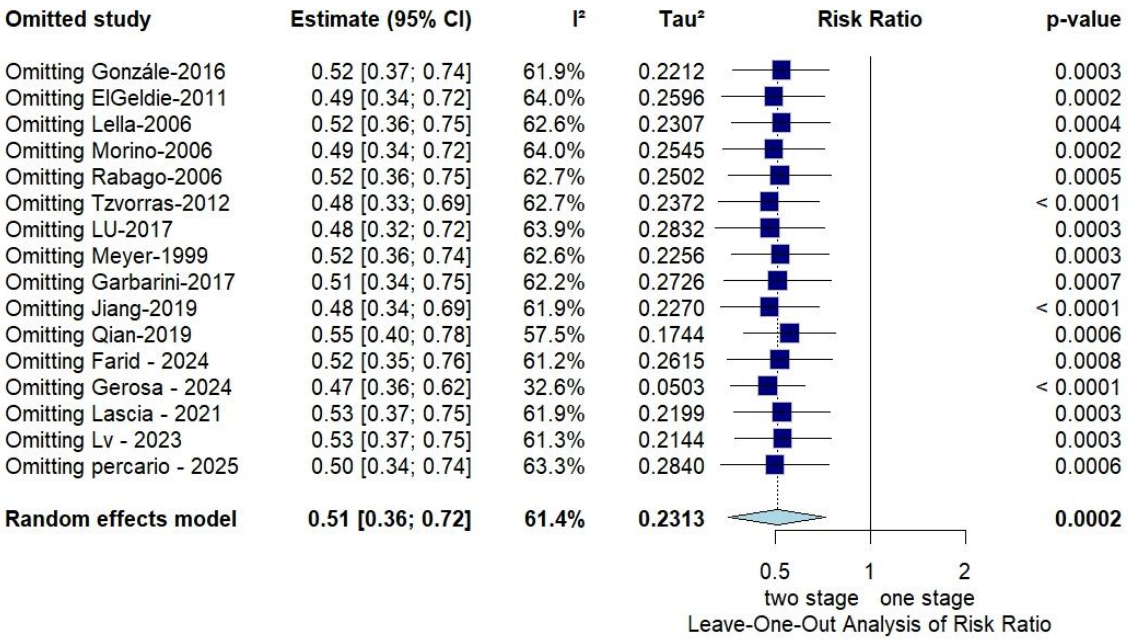

Fig. 14 Sensitivity analysis of Overall Complication Rate

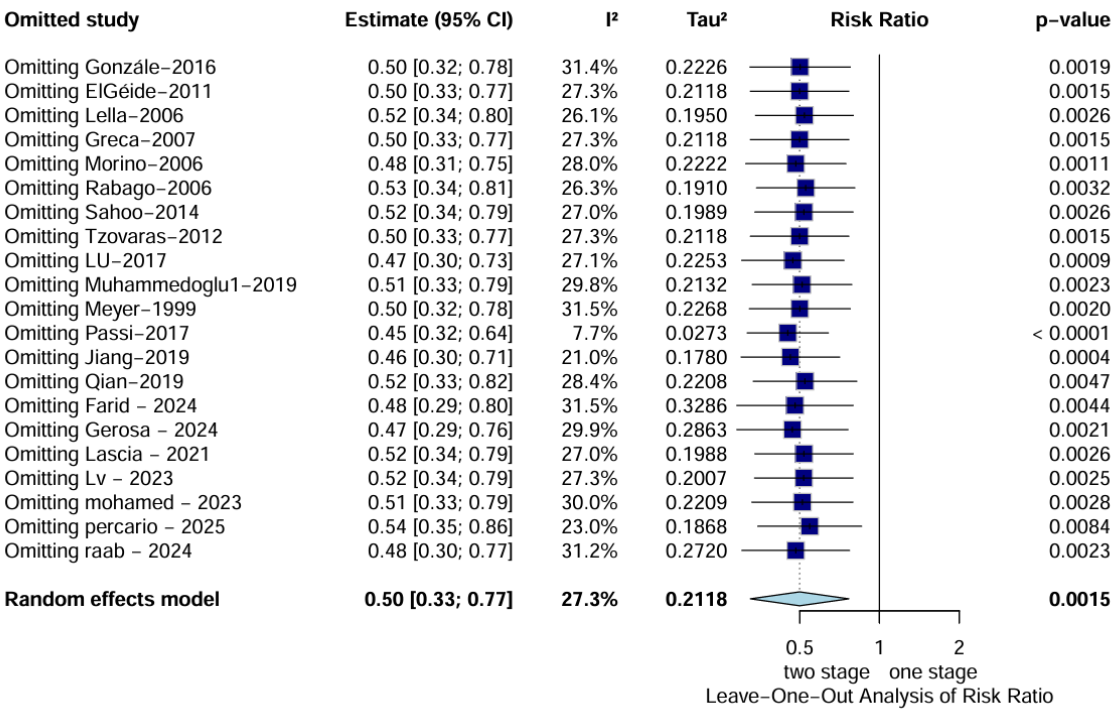

Fig. 15: Sensitivity analysis Postoperative pancreatitis

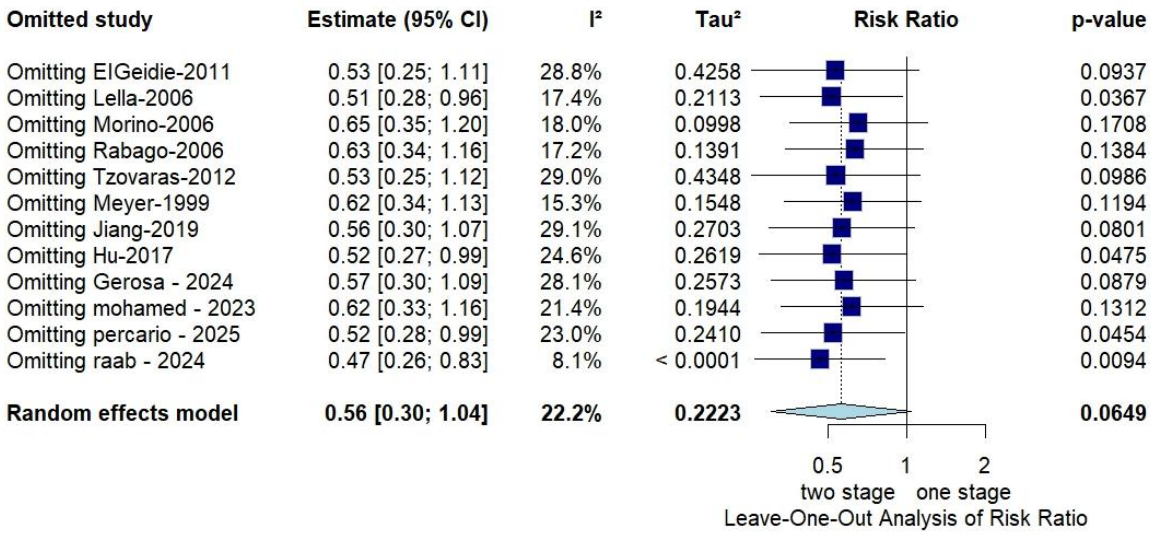

Fig. 16: Sensitivity analysis Operation conversion rate

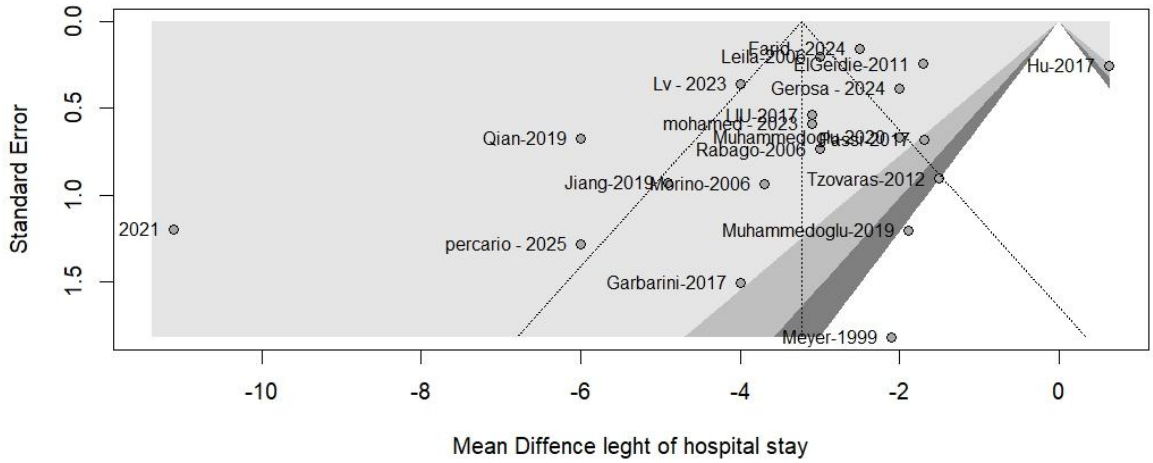

Fig. 17: Funnel plot of post-operative pancreatitis

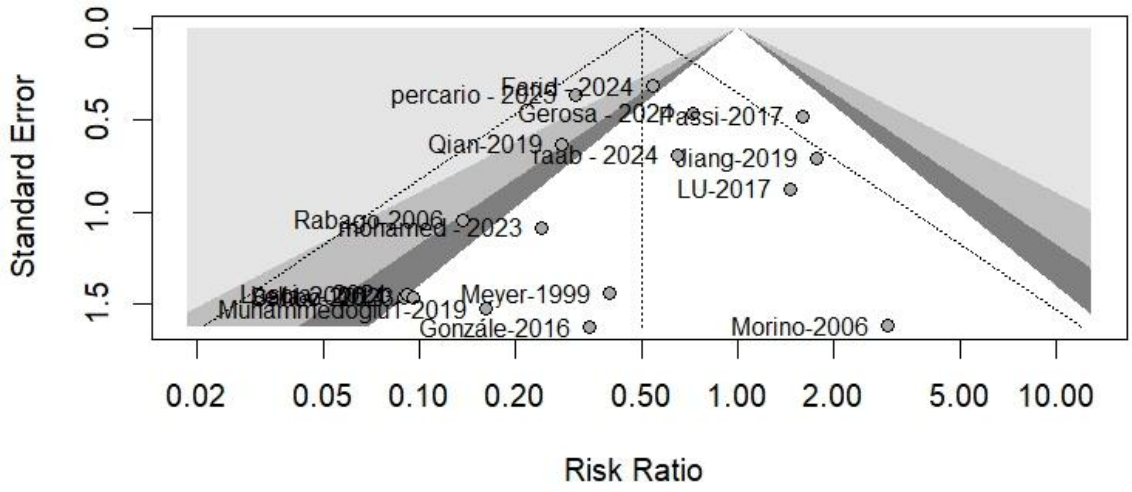

Fig. 18: Funnel plot of length of hospital stays

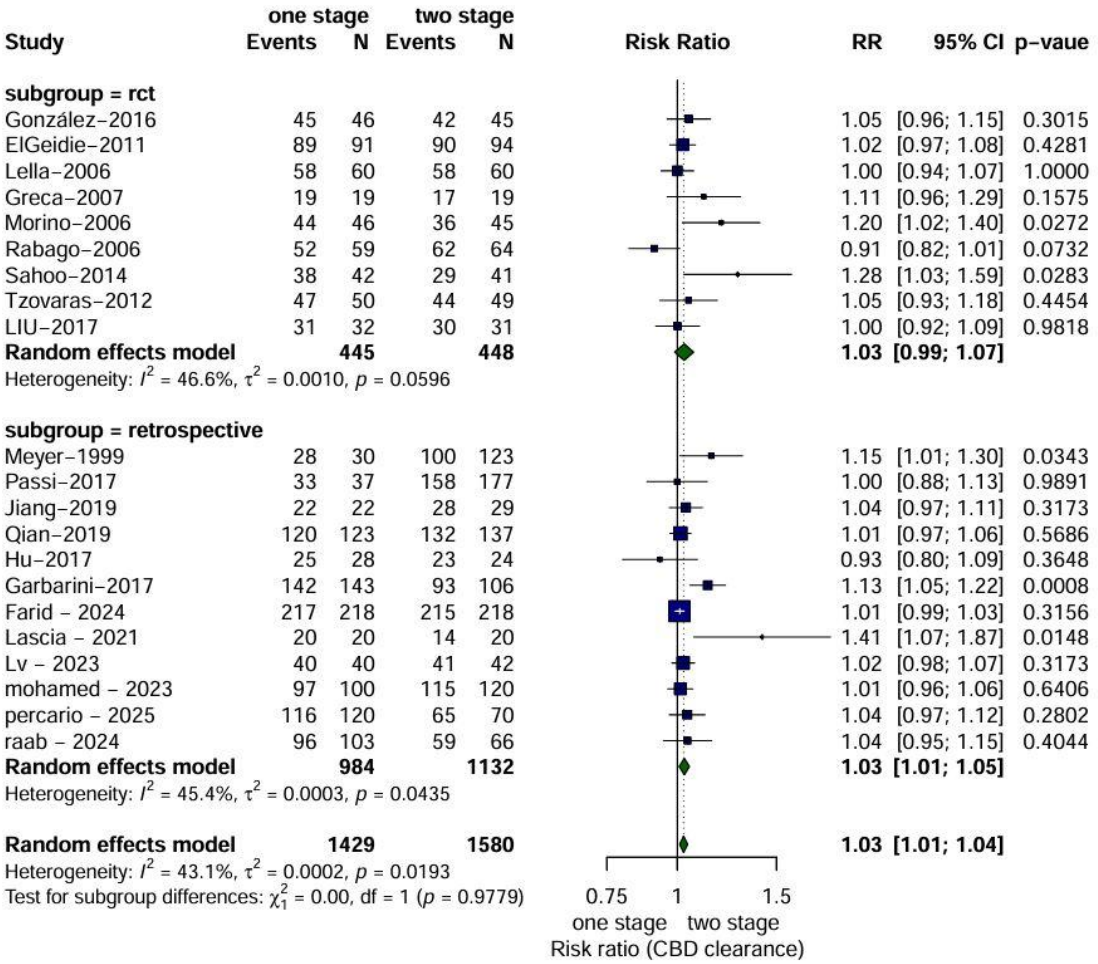

Fig. S18: Sub-grouping according to study design, CBD clearance.

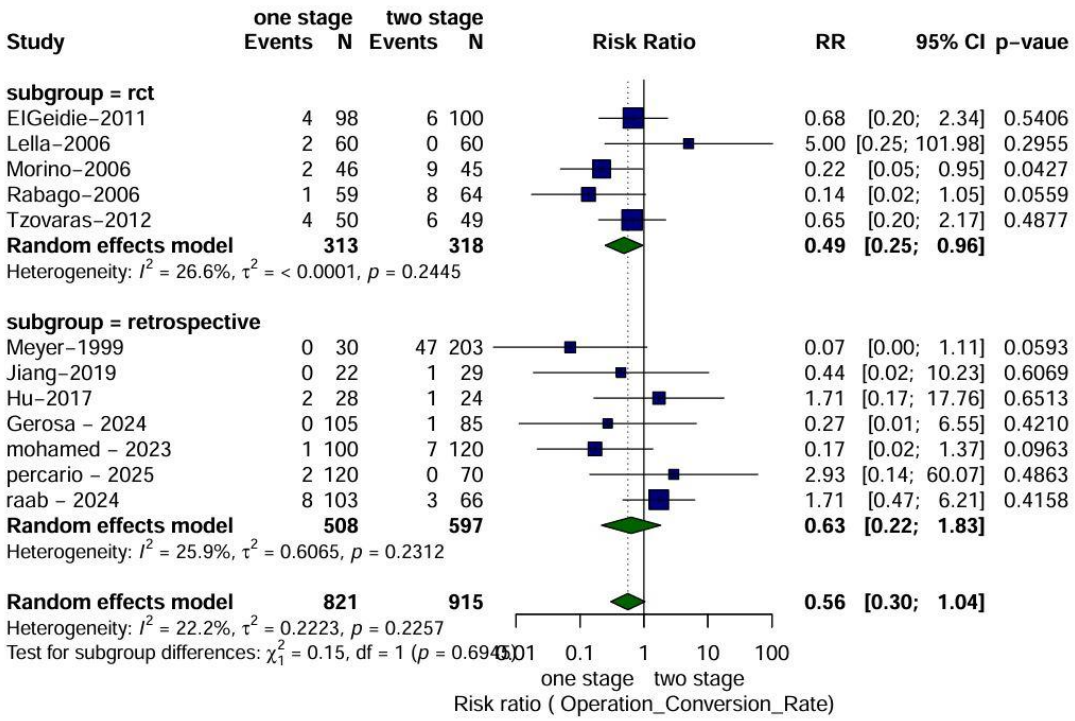

Fig. S19 sub-grouping according to study design, Length of Hospital Stay.

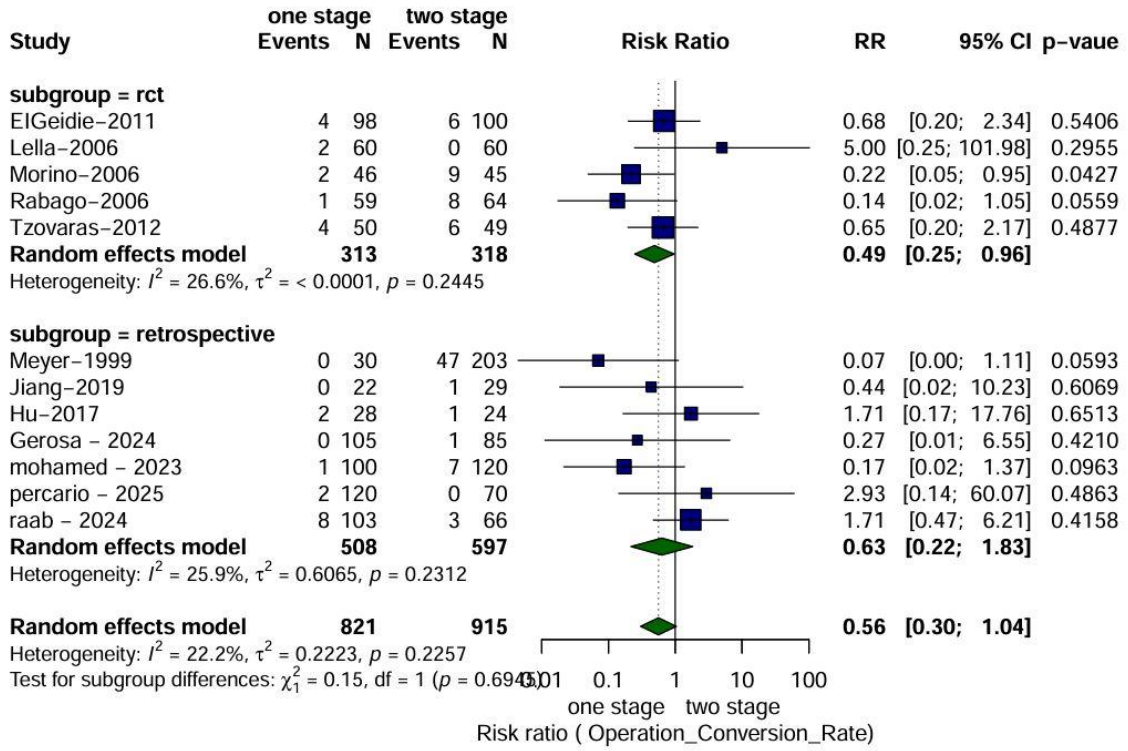

Fig. S20: Sub-grouping according to study design, Operation Conversion Rate.

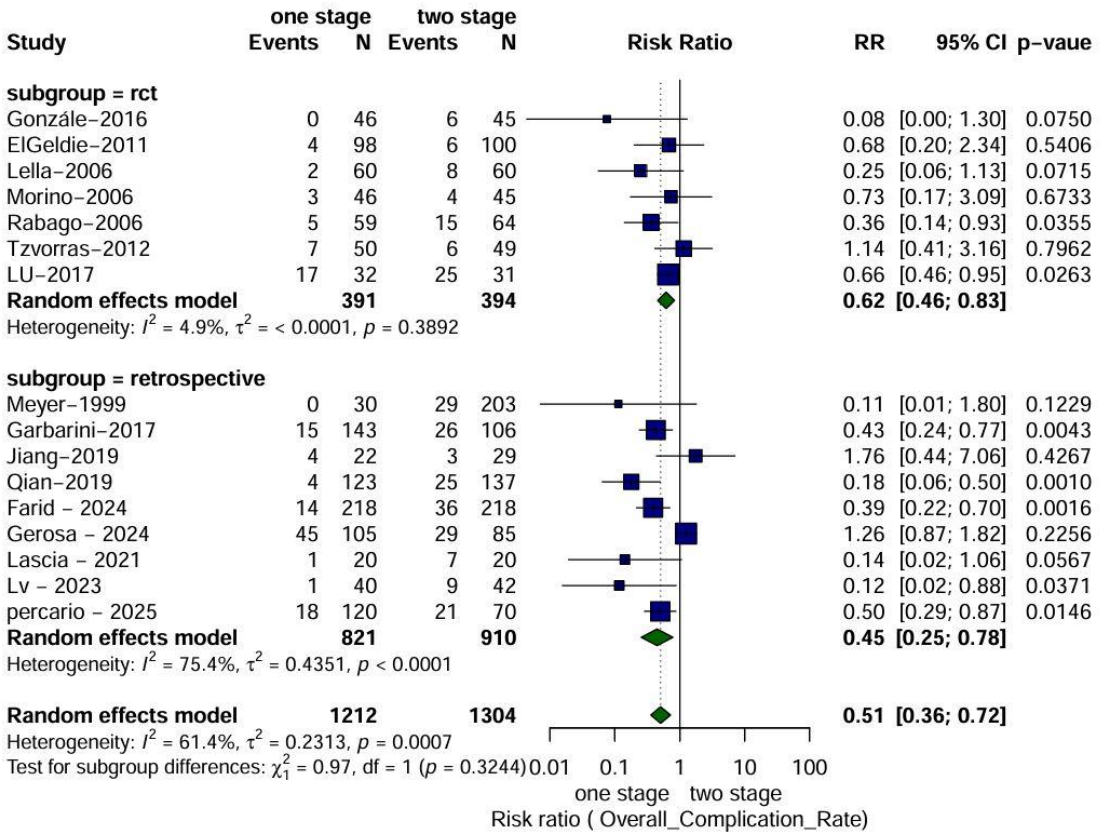

Fig. S21: Sub-grouping according to study design: Overall Complication Rate

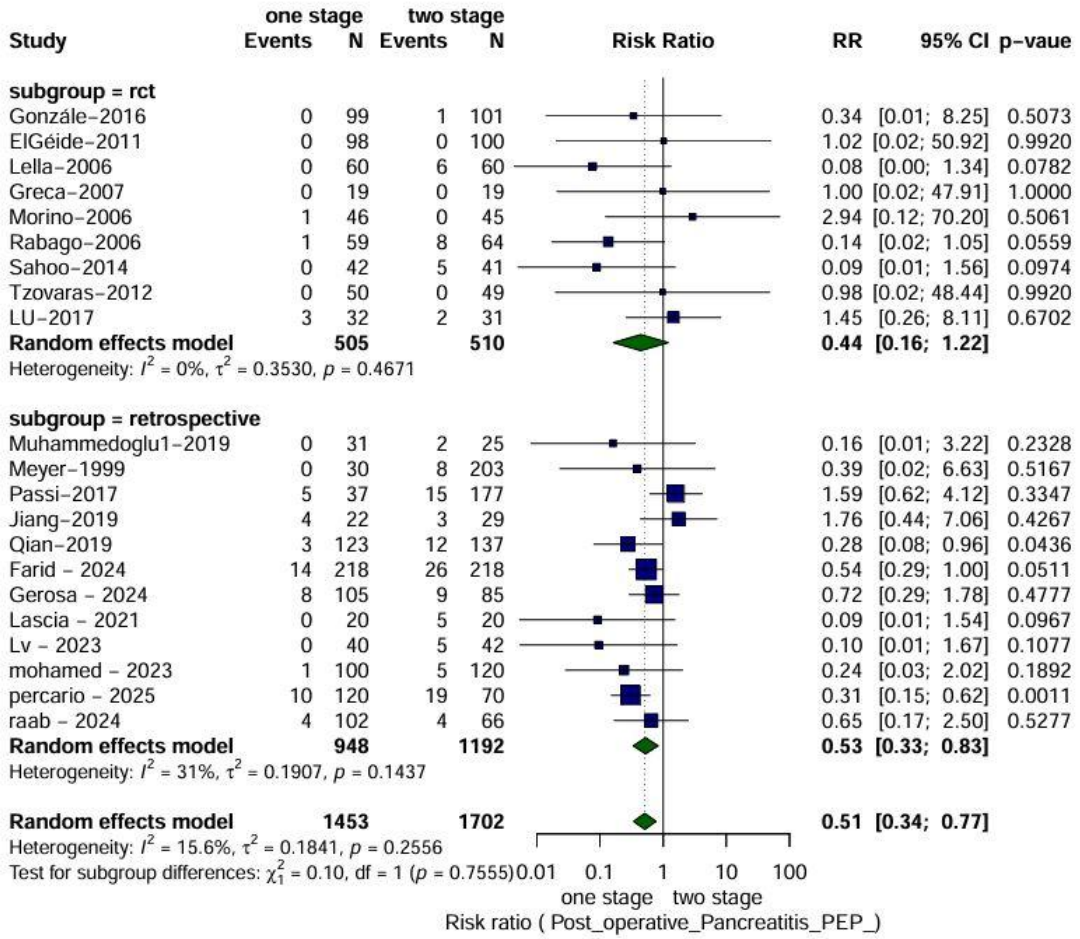

Fig. S22: Sub-grouping according to study design post-operative pancreatitis.