Journal of Clinical Medicine

MDPI

Supplementary Material

Tables

Table S1. List of excluded publications on the full-text level.

	Study	Reason for exclusion
Aepli et al. 2017 [1]	Success and complications of an intra-ductal fully covered self-expanding metal stent (ID-FCSEMS) to treat anastomotic biliary strictures (AS) after orthotopic liver transplantation (OLT)	PICO
Al-Kawas et al. 2005 [2]	Biliary access during endoscopic retrograde cholangiopancreatography: How to precut and a word of caution!	Study design
Aljahdli et al. 2018 [3]	Management of distal malignant biliary obstruction	Study design
Barresi et al. 2016 [4]	A Challenging Diagnosis for a Biliary Stricture	Study design
Bhalla et al. 2019 [5]	Endoscopic Management of Acute Cholecystitis Following Metal Stent Placement for Malignant Biliary Strictures: A View from the Inside Looking in	Study design
Brijbassie et al. 2015 [6]	Transpapillary vs. intraductal fully covered selfexpanding metal stent placement for malignant and benign biliary disease: Does it make a difference?	Duplicate
Chang et al. 2010 [7]	Usefulness of the rendezvous technique for biliary stricture after adult right-lobe living-donor liver transplantation with duct-to-duct anastomosis	PICO
Chang et al. 2012 [8]	Comparative study of rendezvous techniques in post-liver transplant biliary stricture	PICO
Chantarojanasiri et al. 2018 [9]	Usefulness of stent placement above the papilla, so-called, 'inside stent'	Study design
ChiCtr. 2019 [10]	Comparative study for the efficacy of intraductal RFA + biliary stent placement or intraductal Iodine-125 seed + biliary stent placement by percutaneous transhepatic cholangial drainage for treating the patients with unresectable malignant biliary strictures	Protocol
ChiCtr. 2019 [11]	Comparative study of the efficacy of intraductal RFA +stent placement by ERCP and percutaneous transhepatic approach in patients with unresectable malignant biliary strictures	Protocol
Choi et al. 2015 [12]	Feasibility of self expandable metal stent for preservation of sphincter of Oddi function in patients with common bile duct stones a pilot study	PICO
Choi et al. 2019 [13]	Newly modified plastic stent for transhepatic placement above the sphincter of Oddi in treatment of biliary anastomotic stricture after liver transplantation: Preliminary report of 7 patient	PICO
Choi et al. 2020 [14]	Abstract No. 579 Newly modified plastic stent for transhepatic placement above the sphincter of Oddi in treatment of biliary anastomotic stricture after liver transplantation: preliminary report of seven patients	PICO
Dawwas et al. 2016 [15]	Endoscopic assessment and management of biliary strictures	Study design
Douhara et al. 2016 [16]	Inside plastic stent is useful and safety for malignant biliary stenosis including Bismuth IV	PICO

García et al. 2013 [17]	Difficulties encountered for removing fully covered self-expanding metal stents inserted in benign biliary conditions	PICO
Gargouri et al. 2010 [18]	[Biliary stent occlusion]	PICO
Hasegawa et al. 2014 [19]	Appropriate therapeutic strategy for biliary stenting using threaded inside stents based on the location of the malignant obstruction	PICO
Hatzidakis et al. 2001 [20]	Nitinol stents for palliative treatment of malignant obstructive jaundice: Should we stent the sphincter of Oddi in every case?	PICO
Hayasaka et al. 2014 [21]	Endoscopic placement of a large-bore covered self-expandable metallic stent for cholangitis caused by mucus from a pancreatic mucinous neoplasm	Study design
Hayashi et al. 2018 [22]	Endoscopic management of unresectable malignant hilar strictures using threaded inside stents versus metallic stents	PICO
Hyodo et al. 1998 [23]	Endoscopic metallic stenting and intraductal ultrasonography in a case of bile duct cancer	Study design
Inatomi et al. 2011 [24]	The efficacy and safety of threaded biliary plastic “inside-stent” for malignant hilar obstruction	Duplicate
Inoue et al. 2020 [25]	Double radiofrequency ablation with metal stent placement for refractory benign biliary and pancreatic duct strictures	Study design
Inoue et al. 2020 [26]	Intraductal placement of a fully covered metal stent with a long string for distal malignant biliary obstruction without endoscopic sphincterotomy: Prospective multi-center feasibility study	PICO
Ishiwatari et al. 2013 [27]	Newly designed plastic stent for endoscopic placement above the sphincter of Oddi in patients with malignant hilar biliary obstruction	PICO
Itoi et al. 2013 [28]	Current status and issues regarding biliary stenting in unresectable biliary obstruction	Study design
Jo et al. 2015 [29]	Suprapapillary versus transpapillary stent placement for malignant biliary obstruction: which is better?	PICO
Jo et al. 2014 [30]	Supra-papillary versus trans-papillary biliary stent for malignant biliary obstruction: Which is the better?	Conference asbtract
Jprn, Umin. 2014 [31]	Efficacy and Safety of inside stent for preoperative biliary drainage in patients with malignant hilar biliary obstruction: prospective,multicenter,single-arm study	Protocol
Jprn, Umin. 2014 [32]	Efficacy and safety of inside stent in patients with biliary stricture: a prospective multicenter study	Protocol
Jprn, Umin. 2016 [33]	The efficacy and safety of non-flared fully covered self expandable metalic stent for benign biliary duct stricture	Protocol
Jprn, Umin. 2016 [34]	Usefulness of Non-flared Intraductal Fully Covered Metallic Stent for Refractory Biliary Strictures after Living Donor Liver Transplantation	Protocol
Jprn, Umin. 2014 [35]	A Newly Modified Non-Flared Fully Covered Metallic Stent of 12 mm-Diameter with Long Lasso for Intraductal Placement in Patients with Malignant Biliary Stricture: feasibility Study	Protocol
Jprn, Umin. 2011 [36]	Plastic stent placement above the sphincter of Oddi ("inside-stent") for patients of malignant hilar biliary obstruction. A prospective phase II trial	Protocol
Jprn, Umin. 2011 [37]	Endoscopic treatment of malignant bile duct stricture; Comparative study of conventional stent vs inside stent	Protocol
Jprn, Umin. 2011 [38]	Inside-stent placement for malignant hilar obstruction	Protocol

Jprn, Umin. 2018 [39]	Randomized control trial of inside stenting using plastic stent and side by side stenting using 6mm full-covered self expandable metallic stent for endoscopic bilateral biliary drainage to malignant hilar biliary obstruction	Protocol
Jprn, Umin. 2017 [40]	Randomized controlled trial on efficacy of metal stents vs. inside plastic stents for unresectable malignant obstruction of the perihilar bile duct	Protocol
Jprn, Umin. 2017 [41]	Safety and efficacy of preoperative biliary drainage using plastic stent above the sphincter of Oddi (Inside-stent) in patients with malignant hilar biliary obstruction: a prospective study	Protocol
Jprn, Umin. 2017 [42]	The Usefulness of Newly Modified Non-flared Fully Covered Metal Stent of 12 mm in diameter Comparing with Conventional Stent for Periampullary Malignant Biliary Strictures	Protocol
Jprn, Umin. 2019 [43]	Efficacy of inside plastic stent placement for malignant hilar biliary obstruction -multicenter, randomized control trial	Protocol
Jun et al. 2015 [44]	Feasibility of self-expandable metal stents for preservation of sphincter of Oddi function in patients with common bile duct stones: A pilot study	PICO
Kaneko et al. 2014 [45]	Efficacy of plastic stent placement inside bile ducts for the treatment of unresectable malignant hilar obstruction (with videos)	PICO
Kawakami et al. 2012 [46]	Covered metallic stent for ischemic hilar biliary stricture	Study design
Kogure et al. 2011 [47]	Plastic stent placement above the sphincter of Oddi ("inside stent") for biliary strictures	PICO
Kogure et al. 2012 [48]	Endoscopic management of biliary strictures after adult living donor liver transplantation with duct-to-duct reconstruction	PICO
Kogure et al. 2013 [49]	Endoscopic management of biliary strictures after adult living donor liver transplantation with duct-to-duct reconstruction	PICO
Koizumi et al. 2020 [50]	Endoscopic stent placement above the sphincter of Oddi for biliary strictures after living donor liver transplantation	PICO
Koizumi et al. 2019 [51]	ENDOSCOPIC STENT PLACEMENT ABOVE THE SPHINCTER OF ODDI FOR BILIARY STRICTURES AFTER LIVING DONOR LIVER TRANSPLANTATION	PICO
Kubota et al. 2015 [52]	Inside stent and neoadjuvant chemotherapy can provide a chance of surgery in patients with symptomatic, initially unresectable klatskin tumors	Duplicate
Kurita et al. 2013 [53]	Endoscopic stent placement above the intact sphincter of Oddi for biliary strictures after living donor liver transplantation	PICO
Lee et al. 2019 [54]	Usefulness of newly modified fully covered metallic stent of 12 mm in diameter and anti-migration feature for periampullary malignant biliary strictures: Comparison with conventional standard metal stent	PICO
Lee et al. 2016 [55]	Biliary intraductal metastasis from advanced gastric cancer: radiologic and histologic characteristics, and clinical outcomes of percutaneous metallic stent placement	PICO
Lee et al. 2016 [56]	Newly developed flower-type covered selfexpandable metal stent for preventing cholecystitis and pancreatitis: Physical properties	PICO
Lee et al. 2000 [57]	Percutaneous placement of self-expandable metallic biliary stents in malignant extrahepatic strictures: indications of transpapillary and suprapapillary methods	PICO
Leung et al. 2008 [58]	Comparison of accessory performance using a novel ERCP mechanical	PICO

	simulator	
Li et al. 2014 [59]	Treatment experience of fully covered self-expandable metal stents in biliary stricture after liver transplantation	PICO
Liu et al. 1998 [60]	Feasibility of stent placement above the sphincter of Oddi ("inside-stent") for patients with malignant biliary obstruction	PICO
Moon et al. 2012 [61]	Feasibility of placing a modified fully covered self-expandable metal stent above the papilla to minimize stent-induced bile duct injury in patients with refractory benign biliary strictures (with videos)	PICO
Moon et al. 2015 [62]	A newly modified non-flared fully covered metallic stent of 12 mm-diameter with long lasso for intraductal placement in patients with malignant biliary stricture: Feasibility study	PICO
Moon et al. 2012 [63]	Biliary drainage with a modified fully covered self-expandable metallic stent for potentially resectable distal malignant biliary obstruction	PICO
Moon et al. 2016 [64]	Usefulness of non-flared intraductal fully covered metallic stent for refractory biliary strictures after living donor liver transplantation: Interim results of a prospective multicenter trial	PICO
Morita et al. 1992 [65]	[Biliary endoprosthesis of malignant biliary obstruction using expandable metallic stent--preliminary clinical evaluation]	PICO
Mukai et al. 2020 [66]	Ways to improve stenting in unresectable malignant distal biliary obstruction: Stent design, intraductal placement, and protective role of an intact papilla?	Study design
Nct. 2020 [67]	Comparison Between Transpapillary and Suprapapillary Metal Stent	Protocol
Nct. 2020 [68]	Intraintestinal Extended Biliary Stents Preventing Duodenobiliary Reflux in Patients With Biliary Stricture	Protocol
Park et al. 2014 [69]	Intraductal placement of modified fully covered metallic stent for distal malignant biliary obstruction	PICO
Park et al. 2019 [70]	Intraductal placement of non-flared fully covered metallic stent for refractory anastomotic biliary strictures after living donor liver transplantation: Long-term results of prospective multicenter trial	PICO
Pécsi et al. 2020 [71]	Are Suprapapillary Biliary Stents Superior to Transpapillary Biliary Stents?	Study design
Peixoto et al. 2017 [72]	Degenerate intraductal papillary mucinous carcinoma with fish-mouth appearance of the papilla	Study design
Sackmann et al. 2016 [73]	Bile duct stenosis: Diagnosis and management by endoscopy	Study design
Sandha et al. 2016 [74]	Clinical utility of biliary metal stent use across a broad range of indications-interim results of a large prospective multi-centre Canadian registry	PICO
Sasahira et al. 2012 [75]	Endoscopic management with inside stent for proximal benign biliary stricture after laparoscopic cholecystectomy	Study design
Sato et al. 2017 [76]	Endoscopic treatment of biliary strictures after adult living donor liver transplantation with duct-to-duct reconstruction	Study design
Sato et al. 2019 [77]	Long-term outcomes of endoscopic treatment for duct-to-duct anastomotic strictures after living donor liver transplantation	Study design
Shin et al. 2019 [78]	Comparison of the clinical outcomes of suprapapillary and transpapillary stent insertion in unresectable cholangiocarcinom a with biliary obstruction	Duplicate
Sung et al. 1992 [79]	Ascending infection of the biliary tract after surgical sphincterotomy and biliary stenting	PICO

Takada et al. 2019 [80]	THE EFFICACY OF SELF-EXPANDABLE METALLIC STENT PLACEMENT ABOVE THE PAPILLA IN THE PATIENTS WITH DISTAL MALIGNANT BILIARY OBSTRUCTION	PICO
Takahashi et al. 2017 [81]	Initial experience of endoscopic stent placement above the Oddi (inside-stent) for preoperative malignant biliary obstruction	PICO
Taniguchi et al 2018 [82]	Intraductal versus transpapillary fully covered self-expandable metal stent placement for malignant biliary strictures	Duplicate
Taniguchi et al 2019 [83]	Intraductal vs. transpapillary fully covered metal stent placement for malignant biliary strictures	Duplicate
Walters et al. 1998 [84]	Current role of endoscopic retrograde cholangiopancreatography in the management of benign pancreatic disease	Study design
Yamauchi et al. 2019 [85]	Intraductal plastic stent placement is an effective therapy for unresec table malignant biliary obstruction	Duplicate
Yamauchi et al. 2016 [86]	Intraductal plastic stent placement is an effective therapy for malignant biliary strictures	Duplicate
Yamauchi et al. 2018 [87]	Temporary non-flared fully covered self-expandable metal stent placement for refractory benign choledochojejunal anastomotic stricture	Study design
Yang et al. 2019 [88]	Hepatobiliary and Pancreatic: Management of a benign bilio-enteric stricture by a novel covered stent with a long lasso	Study design
Yoo et al. 2020 [89]	Intraductal placement of non-flared fully covered metallic stent for refractory anastomotic biliary strictures after living donor liver transplantation: Long-term results of prospective multicenter trial	PICO
Zeissig et al. 2018 [90]	Direct endoscopy and diagnosis of adenocarcinoma following metal stent-based drainage of a pancreatic cyst	Study design

Table S2. Summary of procedure-related complications and endoscopic sphincterotomy rate.

Author, publication date (patient number in supra-/transpapillary group)	Survival (supra- vs. transpapillary)	Sphincterotomy (supra- vs. transpapillary)	Procedure related complications (supra- vs. transpapillary)
Brijbassie et al. 2015 (112 vs 83) [91]	N/A	partial almost in all cases vs 83	bleeding: N/A cholecystitis: N/A cholangitis: 7 vs 6 pancreatitis: N/A perforation: N/A
Cho et al. (abstract) 2013 (40 vs 44) [92]	Mean: 221.8±171.1 vs 284±174.5 days (p=0.414)	0 vs 44	bleeding: 0 vs 0 cholecystitis: 1 vs 2 cholangitis: 2 vs 2 (p=0.987) pancreatitis: 0 vs 1 perforation: N/A
Cosgrove et al. 2016 (52 vs 120) [93]	Median: 26 vs 29 weeks (p= 0.49)	5 vs 108	bleeding: 0 vs 2 cholecystitis: N/A cholangitis: 0 vs 1 pancreatitis: 0 vs 9 (p=0.059) perforation: 1 vs 2
Inatomi et al. 2013 (12 vs. 17) [94]	N/A	In metal stents	bleeding: 0 vs 0 cholecystitis: N/A cholangitis: N/A pancreatitis: N/A perforation: 0 vs 0
Kobayashi et al. 2015 (25 vs 32) [95]	N/A	3 vs 3	bleeding: 1 vs. 0 cholecystitis: N/A cholangitis: 0 vs. 0 pancreatitis: 1 vs. 4 perforation: N/A
Kubota et al. 2016 (17 vs 23) [96]	24.8 vs. 20.4 months (p= 0.327)	0 vs. 4	bleeding: N/A cholecystitis: N/A cholangitis: 7 vs 20 pancreatitis: 2 vs 1 perforation: N/A
Lee et al. 2018 (abstract) (27 vs 29) [97]	N/A	N/A	N/A
Pedersen et al. 1998 (17 vs 17) [98]	Median (IQR): 144 (82-347) vs 46 (35-155) days	0 vs. 0	bleeding: 0 vs 0 cholecystitis: 0 vs 0 cholangitis: 1 vs 3 pancreatitis: 0 vs 0 perforation: 0 vs 0
Shin et al. 2020 (44 vs 29) [99]	Cumulative patient survival at 1, 6, 12 months: 91% vs 90%, 43% vs 35%, 11% vs 17%	44 vs 29	bleeding: N/A cholecystitis: 2 vs 0 cholangitis: 6 vs 5 pancreatitis: 0 vs 2 perforation: N/A
Takada et al. 2020 (30 vs 43) [100]	Median: 269 days vs 302 days (p= 0.891)	10 vs 12	bleeding: N/A cholecystitis: 0 vs 2 cholangitis: N/A

			pancreatitis: N/A perforation: N/A
Taniguchi et al. 2020 (abstract) (38 vs 58) [101]	N/A	N/A	N/A
Uchida et al. 2005 (16 vs 16) [102]	N/A	2 vs. 1	bleeding: 0 vs. 0 cholecystitis: 0 vs 0 cholangitis: 0 vs 0 pancreatitis: 0 vs 0 perforation: 0 vs. 0
Yamaguchi et al. 2019 (abstract) (40 vs 46) [103]	N/A	N/A	bleeding: 0 vs. 0 cholecystitis: 3 vs N/A cholangitis: 0 vs 0 pancreatitis: 0 vs 0 perforation: N/A

N/A: not available.

Table S3. Summary of findings table comprising the level of evidence for stent patency, stent migration, post-ERCP cholangitis, and pancreatitis.

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with transpapillary stent	Risk with suprapapillary stent				
Patency assessed with: WMD		WMD 47.2 more (18.75 more to 75.64 more)	-	971 (11 observational studies) [91-96, 98-100, 102]	⊕⊕◯◯ Low	Suprapapillary biliary stent was associated with longer stent patency.
Stent migration assessed with: OR	10 per 100	7 per 100 (2 to 25)	OR 0.66 (0.15 to 2.94)	376 (7 observational studies) [92, 95-98, 100, 102]	⊕◯◯◯ Very low	No significant difference appeared concerning the stent migration between the suprapapillary and transpapillary stent positions.
Post-ERCP cholangitis assessed with: OR	12 per 100	6 per 100 (3 to 13)	OR 0.52 (0.25 to 1.10)	598 (6 observational studies) [91-93, 96, 98, 99]	⊕◯◯◯ Very low	No significant difference appeared concerning the post-ERCP cholangitis rate between the suprapapillary and transpapillary stent positions.
Post-ERCP pancreatitis assessed with: OR	7 per 100	3 per 100 (1 to 9)	OR 0.38 (0.11 to 1.28)	426 (5 observational studies) [92, 93, 95, 96, 99]	⊕◯◯◯ Very low	No significant difference appeared concerning the post-ERCP pancreatitis rate between the suprapapillary and transpapillary stent positions.

*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). WMD: weighted mean difference; CI: confidence interval; OR: odds ratio.

Table S4. Summary of findings table comprising the level of evidence for the subgroup of metal stents.

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with transpapillary stent	Risk with suprapapillary stent				
Patency assessed with: WMD		WMD 10.18 days more (38.83 fewer to 59.18 more)	-	597 (5 observational studies) [91-93, 99, 100]	⊕◯◯◯ Very low	No significant difference appeared concerning the stent patency between the suprapapillary and transpapillary stent positions.
Post-ERCP cholangitis assessed with: OR	5 per 100	4 per 100 (2 to 9)	OR 0.85 (0.40 to 1.81)	524 (4 observational studies) [91-93, 99]	⊕◯◯◯ Very low	No significant difference appeared concerning the rate of post-ERCP cholangitis between the suprapapillary and transpapillary stent positions.
Post-ERCP pancreatitis assessed with: OR	6 per 100	1 per 100 (0 to 6)	OR 0.16 (0.03 to 0.95)	329 (3 observational studies) [92, 93, 99]	⊕◯◯◯ Very low	Significantly lower rate of post-ERCP pancreatitis appeared in the suprapapillary stent position group.

*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). WMD: weighted mean difference; CI: confidence interval; OR: odds ratio.

Table S5. Summary of findings table comprising the level of evidence for the subgroup of plastic stents.

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with transpapillary stent	**Risk with suprapapillary stent**				
Patency assessed with: WMD		WMD **78.45 days more** (41.42 more to 115.47 more)	-	278 (6 observational studies) [94-96, 98, 102, 103]	⊕◯◯◯ Very low	Suprapapillary biliary stent was associated with longer stent patency.
Stent migration assessed with: OR	11 per 100	**17 per 100** (3 to 60)	OR 1.57 (0.22 to 11.47)	163 (4 observational studies) [95, 96, 98, 102]	⊕◯◯◯ Very low	No significant difference appeared concerning the stent migration between the suprapapillary and transpapillary stent positions.

***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). WMD: weighted mean difference; **CI:** confidence interval; **OR:** odds ratio.

Table S6. Summary of findings table comprising the level of evidence for the subgroup of full text included.

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with transpapillary stent	Risk with suprapapillary stent				
Patency assessed with: WMD		WMD 60.74 days more (14.1 more to 107.38 more)	-	510 (8 observational studies) [93-96, 98-100, 102]	⊕⊕◯◯ Low	Suprapapillary biliary stent was associated with longer stent patency.
Post-ERCP cholangitis assessed with: OR	15 per 100	6 per 100 (2 to 15)	OR 0.34 (0.12 to 0.99)	319 (4 observational studies) [93, 96, 98, 99]	⊕◯◯◯ Very low	Significantly lower rate of post-ERCP cholangitis appeared in the suprapapillary stent position group.
Post-ERCP pancreatitis assessed with: OR	8 per 100	3 per 100 (1 to 13)	OR 0.37 (0.08 to 1.69)	342 (4 observational studies) [93, 95, 96, 99]	⊕◯◯◯ Very low	No significant difference appeared concerning the post-ERCP pancreatitis rate between the suprapapillary and transpapillary stent positions.

*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). WMD: weighted mean difference; CI: confidence interval; OR: odds ratio.

Figures

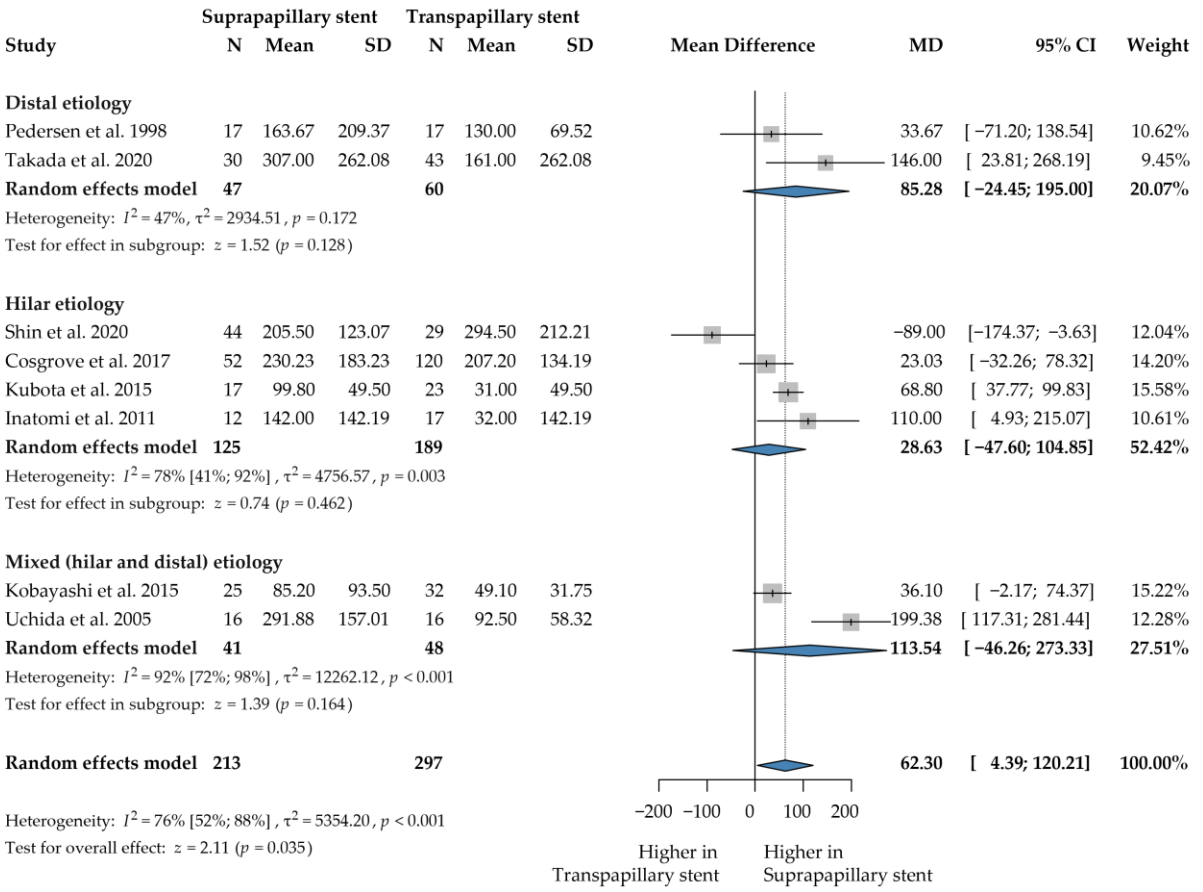

Figure S1. Forest plot comparing stent patency time between suprapapillary and transpapillary stents, including full texts with malignant indications. WMD: weighted mean difference; p: P-value; CI: confidence interval; I-squared: I^2. Unit of measurement: day. [93-96, 98-100, 102]

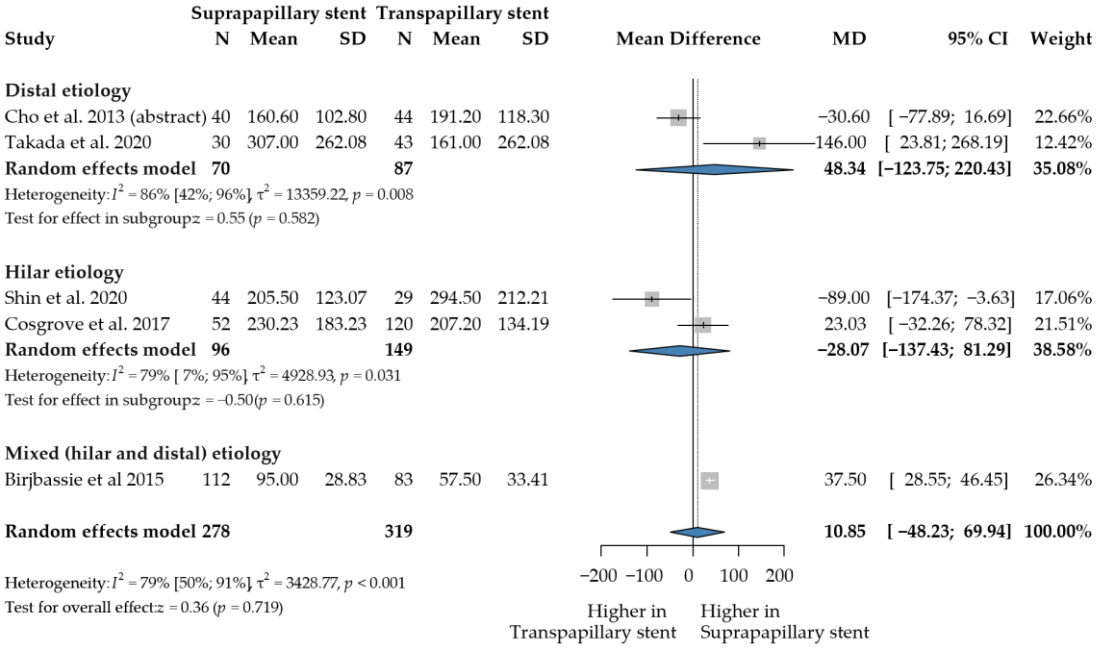

Figure S2. Forest plot comparing stent patency time between suprapapillary and transpapillary metal stents. WMD: weighted mean difference; p: P-value; CI: confidence interval; I-squared: I^2. Unit of measurements: day. [91-93, 99, 100]

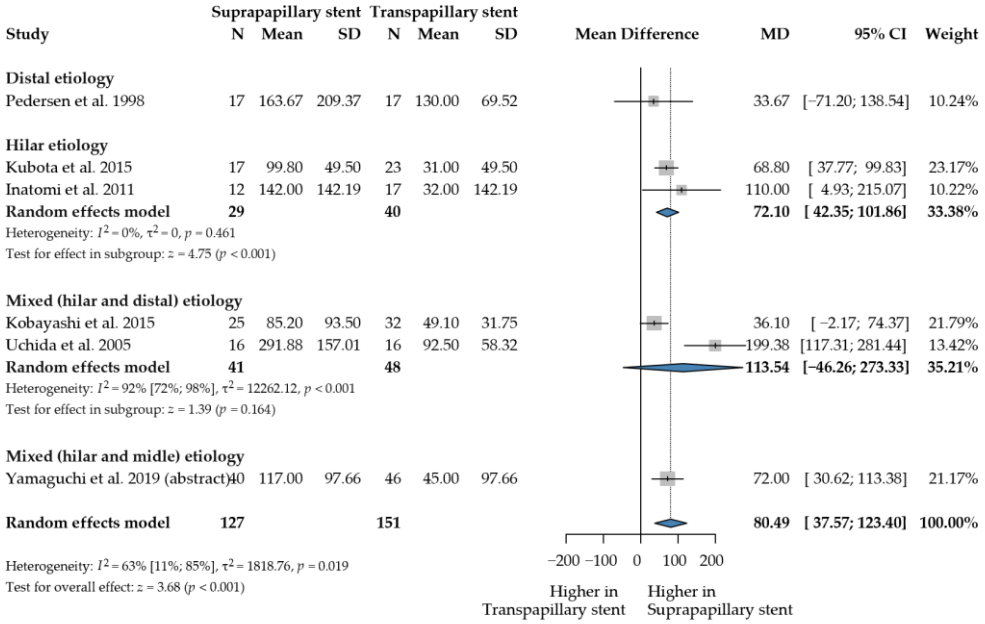

Figure S3. Forest plot comparing stent patency time between suprapapillary and transpapillary plastic stents. WMD: weighted mean difference; p: P-value; CI: confidence interval; I-squared: I^2. Unit of measurement: day. [94-96, 98, 102, 103]

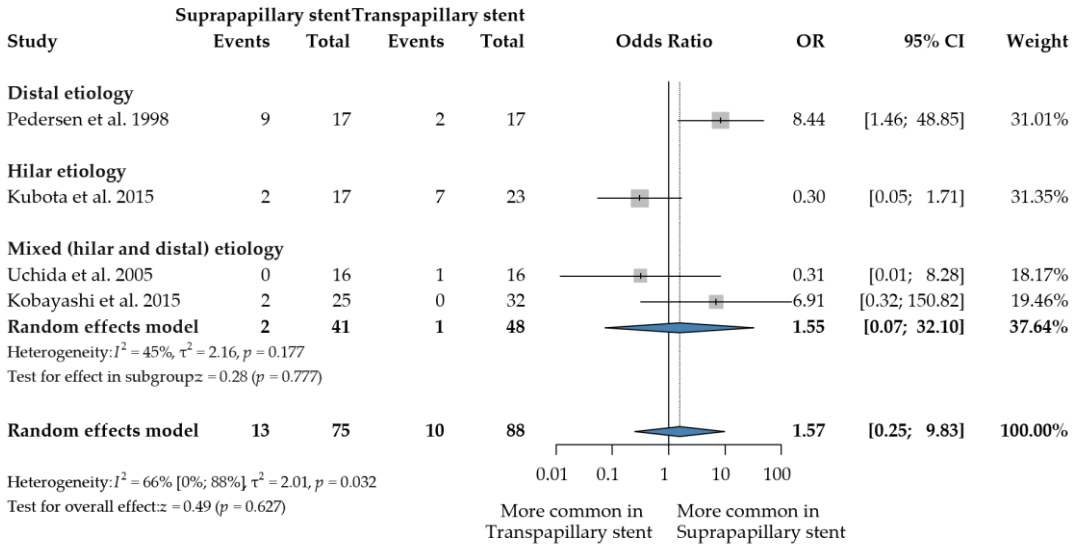

Figure S4. Forest plot comparing stent migration rate between suprapapillary and transpapillary plastic stents. OR: odds ratio, p: P-value; CI: confidence interval; I-squared: I². [95, 96, 98, 102]

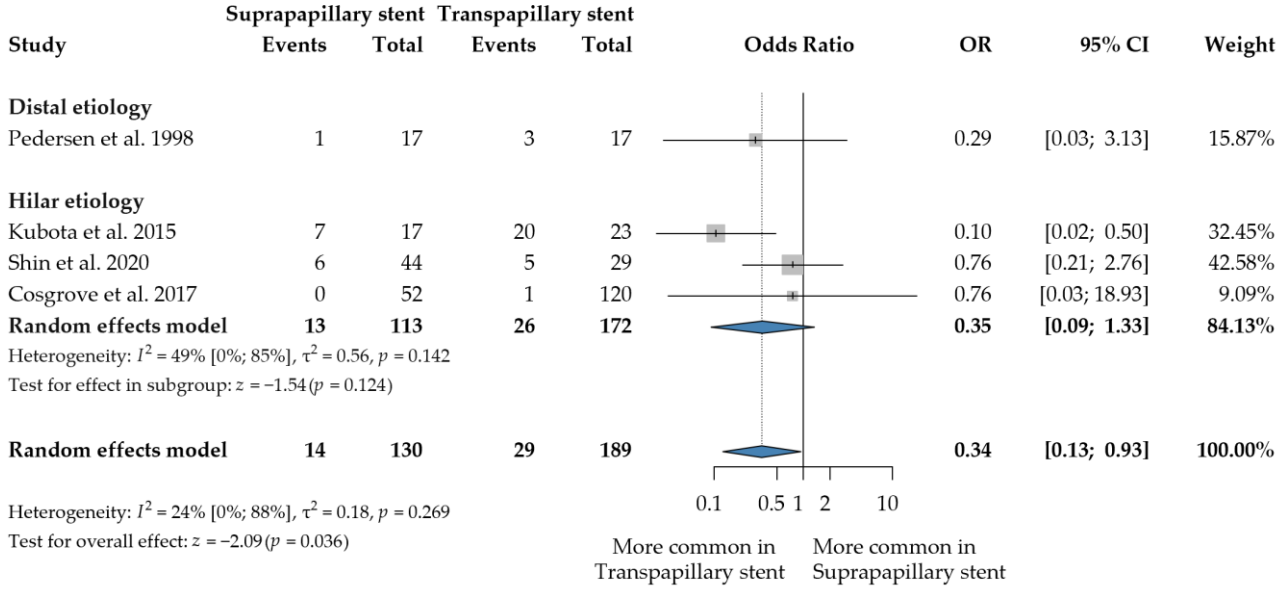

Figure S5. Forest plot comparing cholangitis rate between suprapapillary and transpapillary stents, including full texts with malignant indications. OR: odds ratio, p: P-value; CI: confidence interval; I-squared: I². [93, 96, 98, 99]

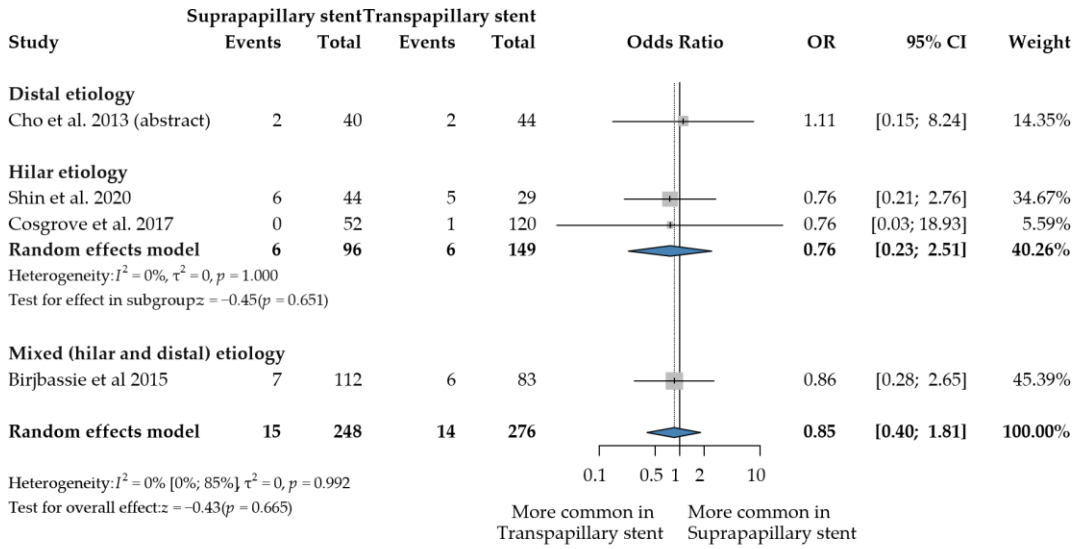

Figure S6. Forest plot comparing cholangitis rate between suprapapillary and transpapillary metal stents. OR: odds ratio, p: P-value; CI: confidence interval; I-squared: I^2. [91-93, 99]

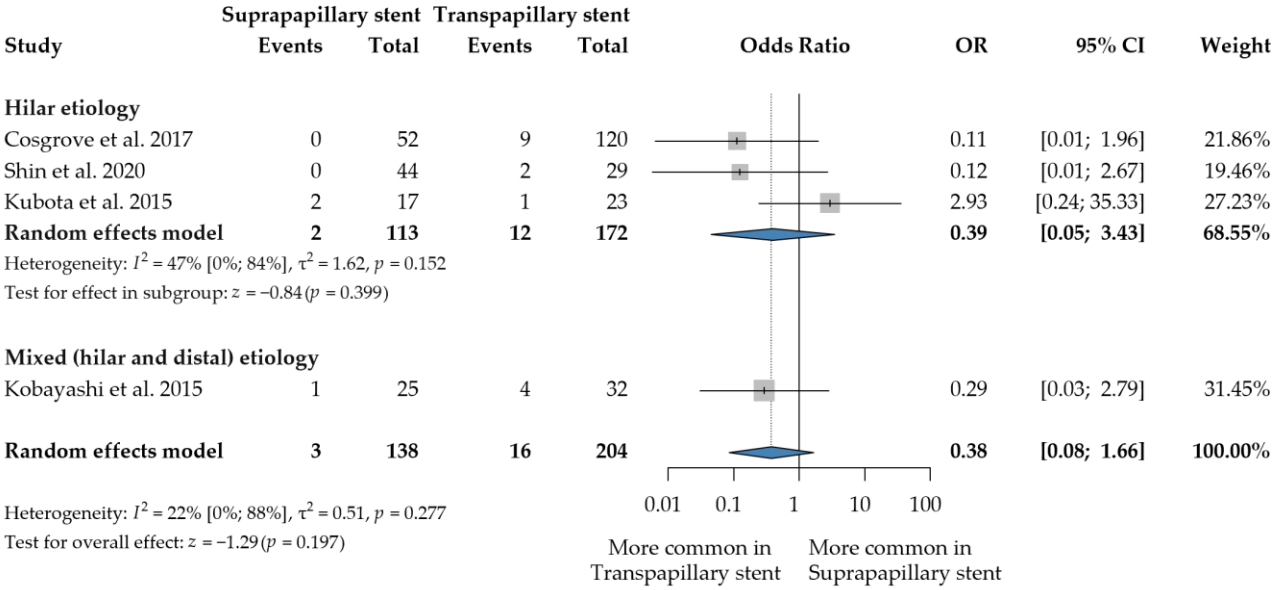

Figure S7. Forest plot comparing pancreatitis rate between suprapapillary and transpapillary stents including full texts. OR: odds ratio, p: P-value; CI: confidence interval; I-squared: I². [93, 95, 96, 99]

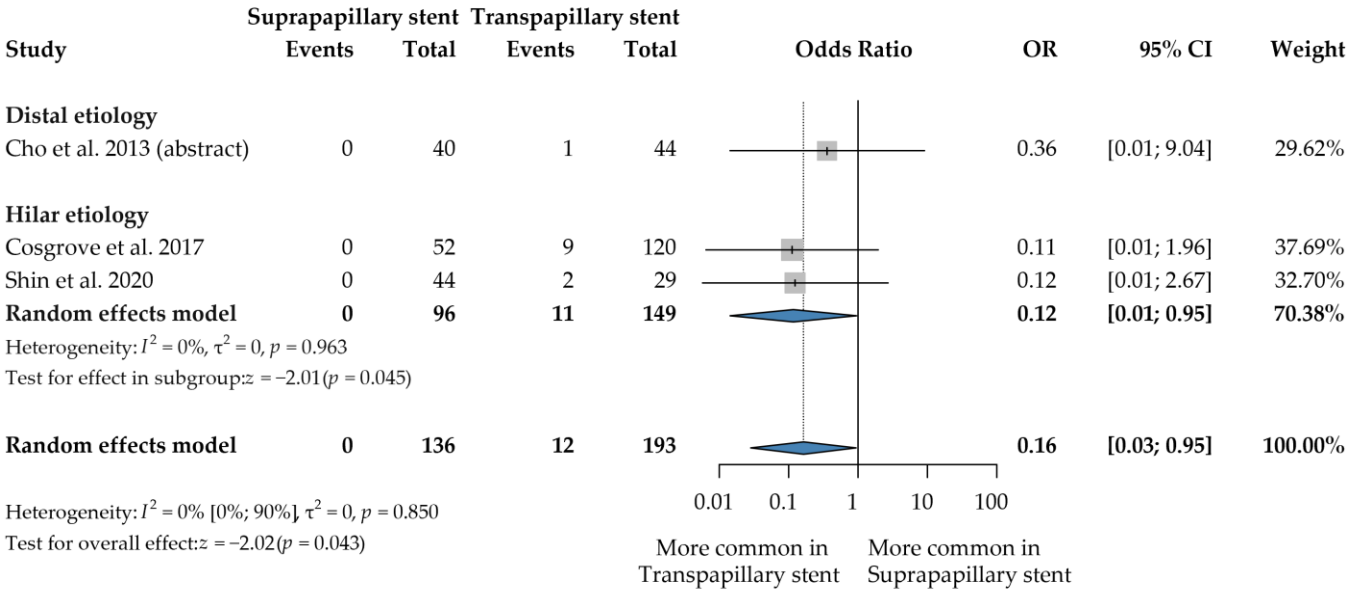

Figure S8. Forest plot comparing pancreatitis rate between suprapapillary and transpapillary metal stents. OR: odds ratio, p: P-value; CI: confidence interval; I-squared: I². [92, 93, 99]

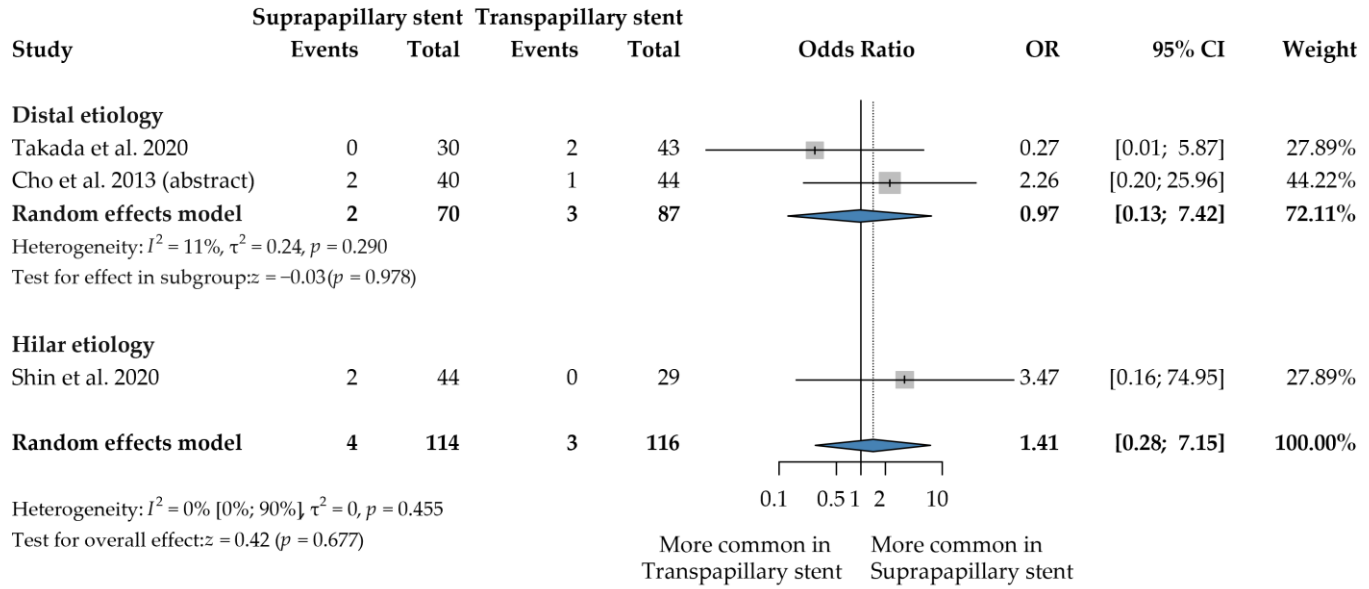

Figure S9. Forest plot comparing cholecystitis rate between suprapapillary and transpapillary metal stents. OR: odds ratio, p: P value; CI: confidence interval; I-squared: I^2. [92, 99, 100]

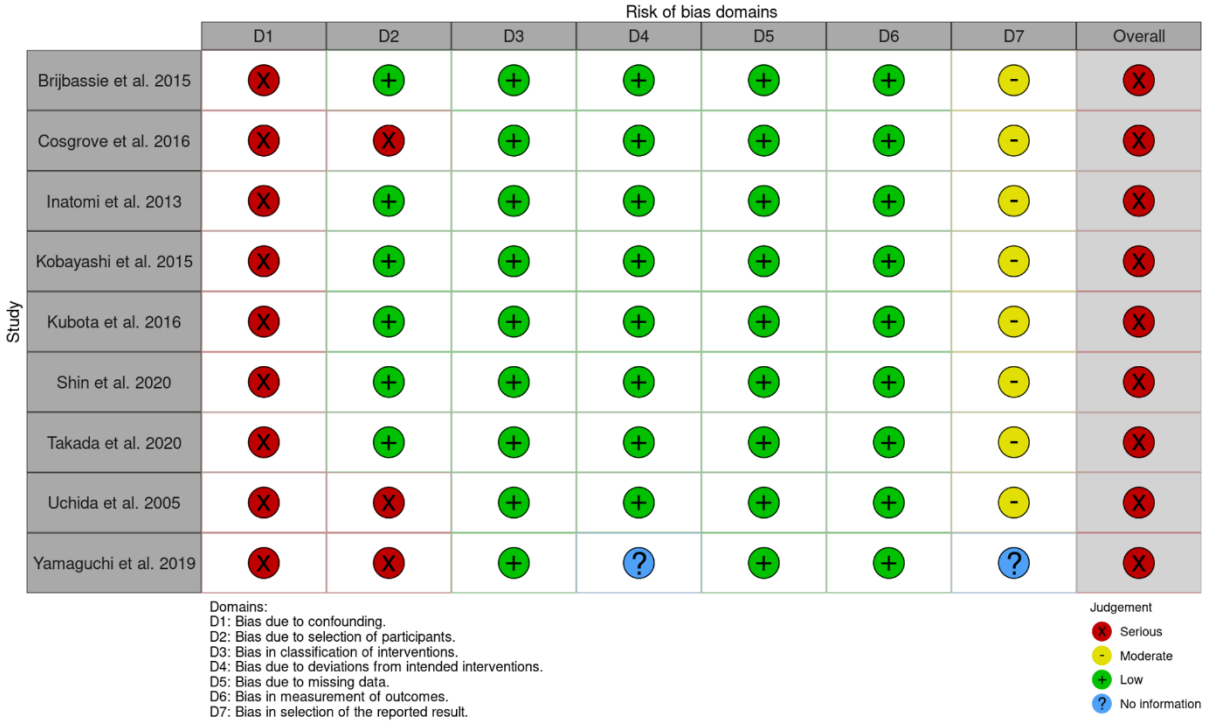

Figure S10. Risk of Bias Assessment (study-level judgments) in observational studies with the Risk Of Bias In Non-Randomized Studies - of Interventions (ROBINS-I). Outcome: Stent patency time. [91, 93-96, 99, 100, 102, 103]

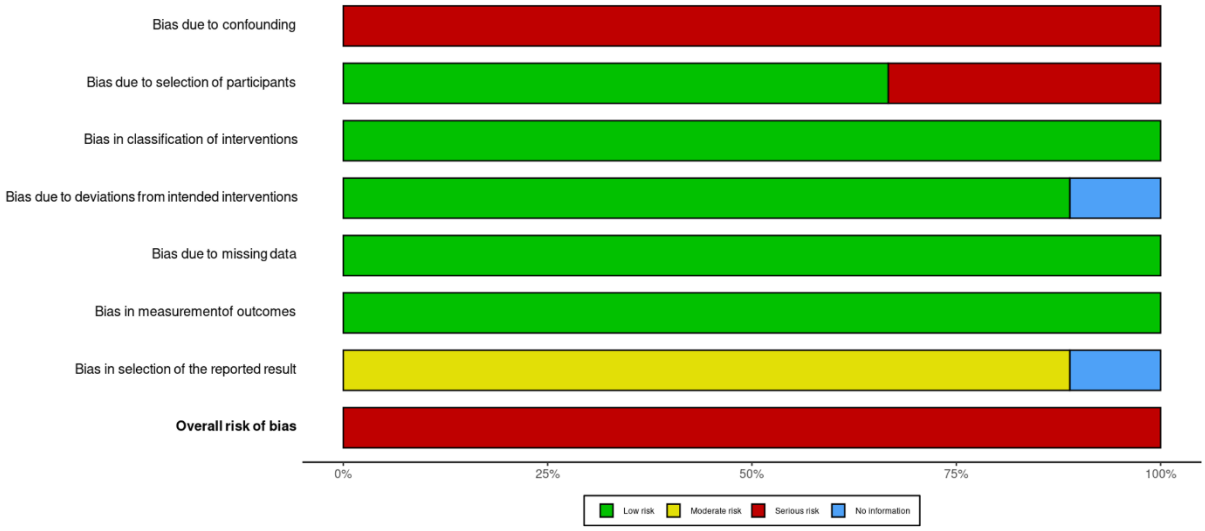

Figure S11. Risk of bias assessment (domain-level judgments) in observational studies with the Risk Of Bias In Non-Randomized Studies - of Interventions (ROBINS-I). Outcome: Stent patency time.[91, 93-96, 99, 100, 102, 103]

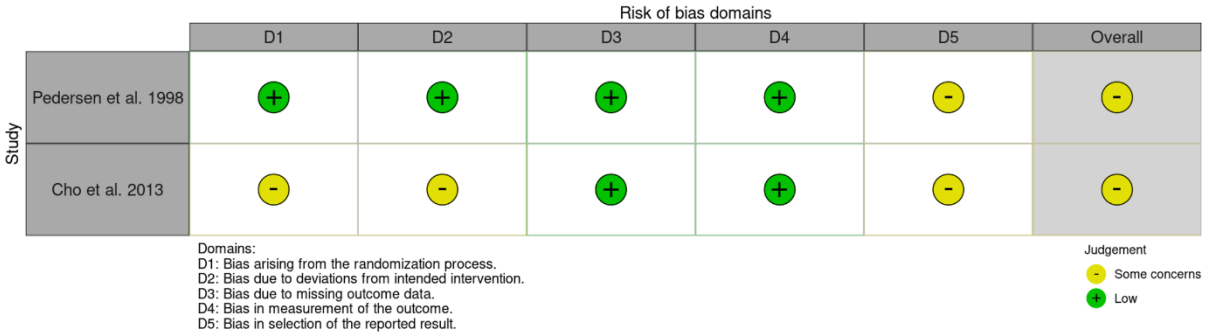

Figure S12. Risk of Bias Assessment (study-level judgments) with version 2 of the Cochrane risk-of-bias tool for randomized trials (RoB 2). Outcome: Stent patency time. [92, 98]

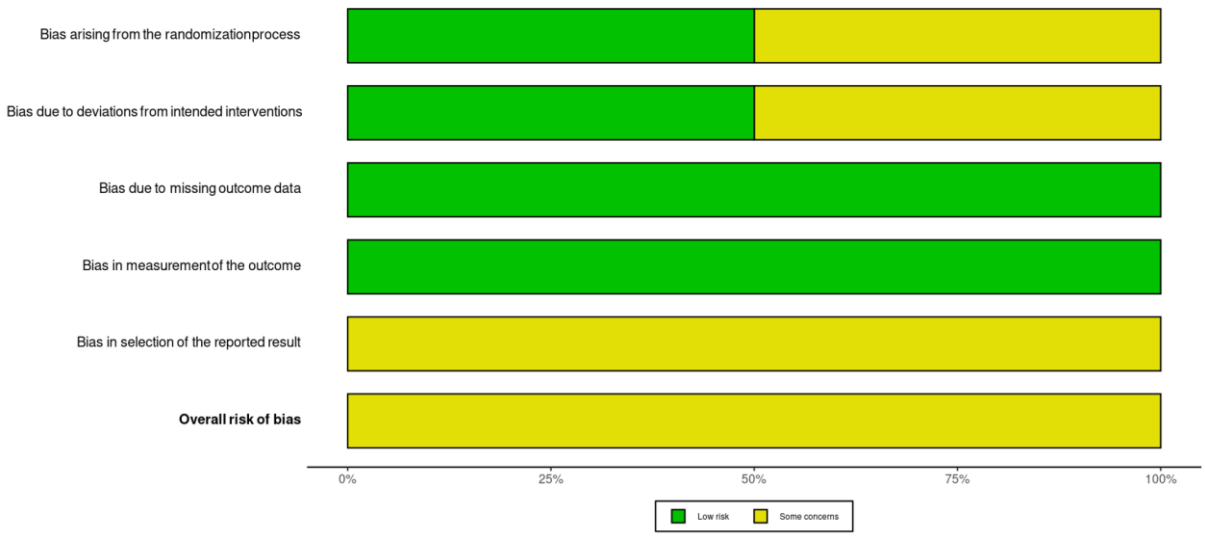

Figure S13. Risk of bias assessment (domain-level judgments) with version 2 of the Cochrane Risk-of-Bias tool for randomized trials (RoB 2). Outcome: Stent patency time. [92, 98]

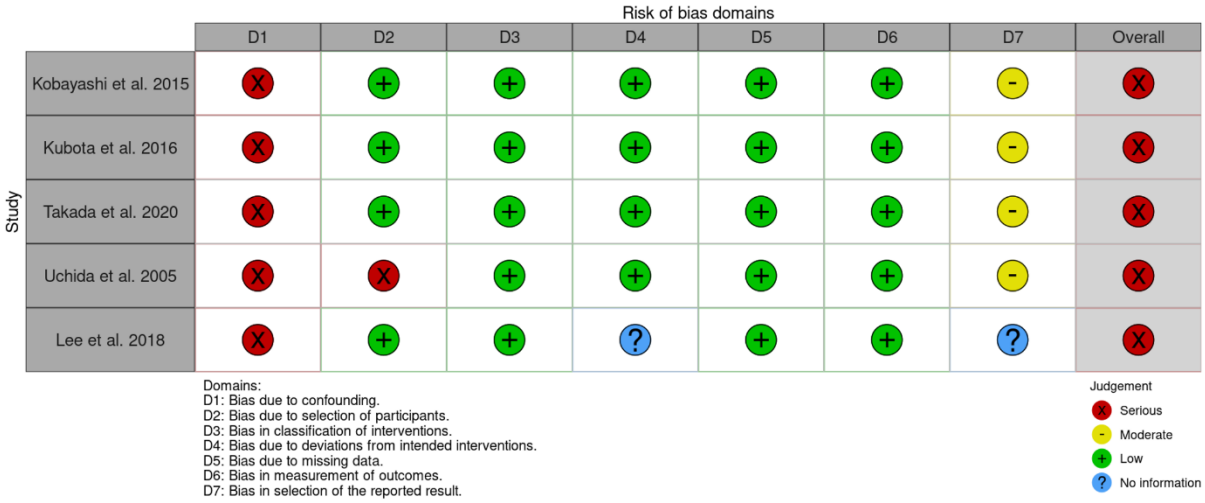

Figure S14. Risk of Bias Assessment (study-level judgments) in observational studies with the Risk Of Bias In Non-Randomized Studies - of Interventions (ROBINS-I). Outcome: Stent stent migration. [95-97, 100, 102]

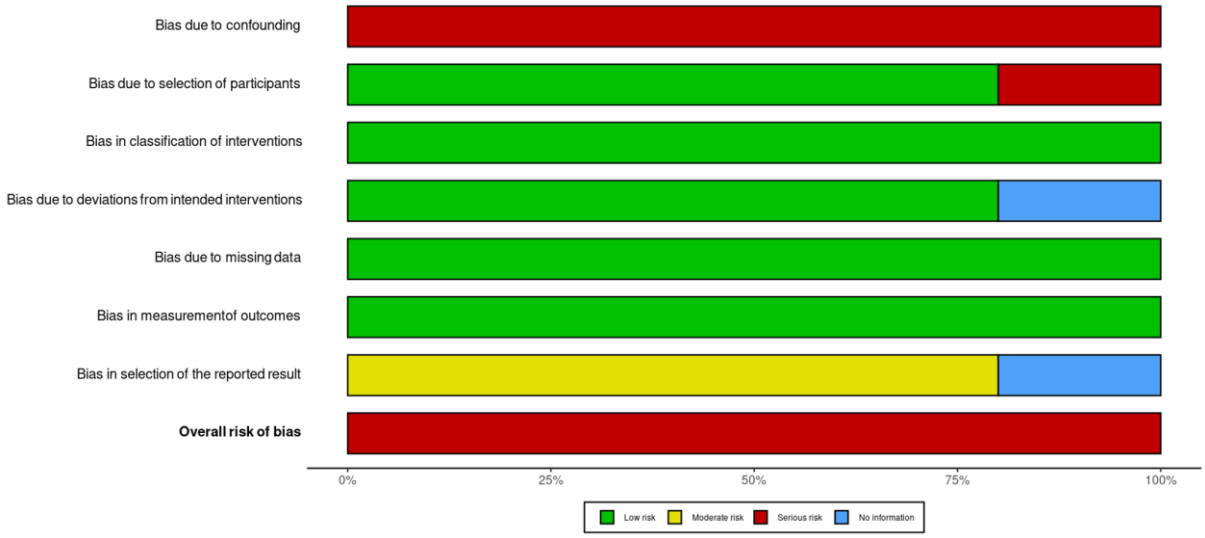

Figure S15. Risk of bias assessment (domain-level judgments) in observational studies with the Risk Of Bias In Non-Randomized Studies - of Interventions (ROBINS-I). Outcome: Stent stent migration. [95-97, 100, 102]

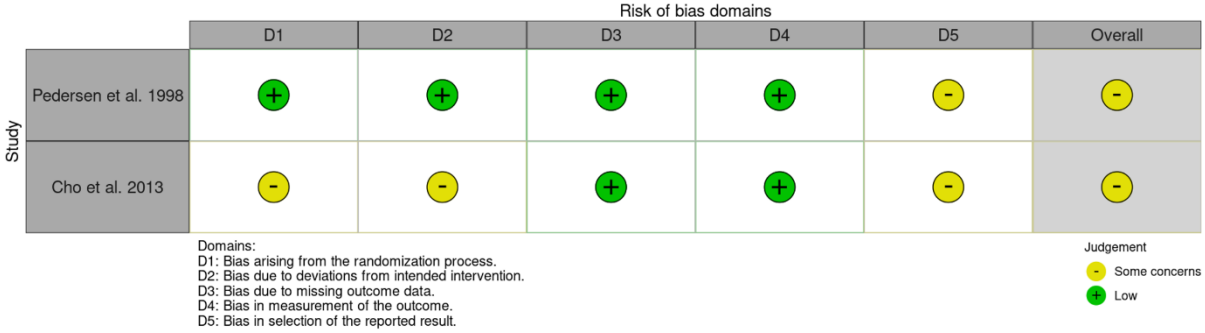

Figure S16. Risk of Bias Assessment (study-level judgments) with version 2 of the Cochrane Risk-of-Bias tool for randomized trials (RoB 2). Outcome: Stent stent migration. [92, 98]

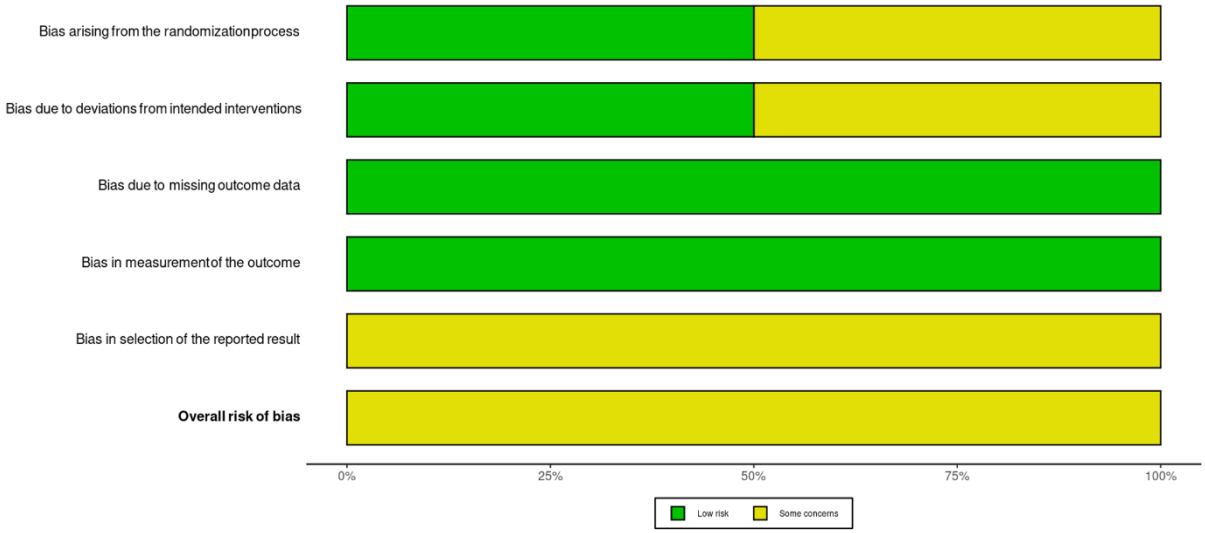

Figure S17. Risk of bias assessment (domain-level judgments) with version 2 of the Cochrane Risk-of-Bias tool for randomized trials (RoB 2). Outcome: Stent stent migration. [92, 98]

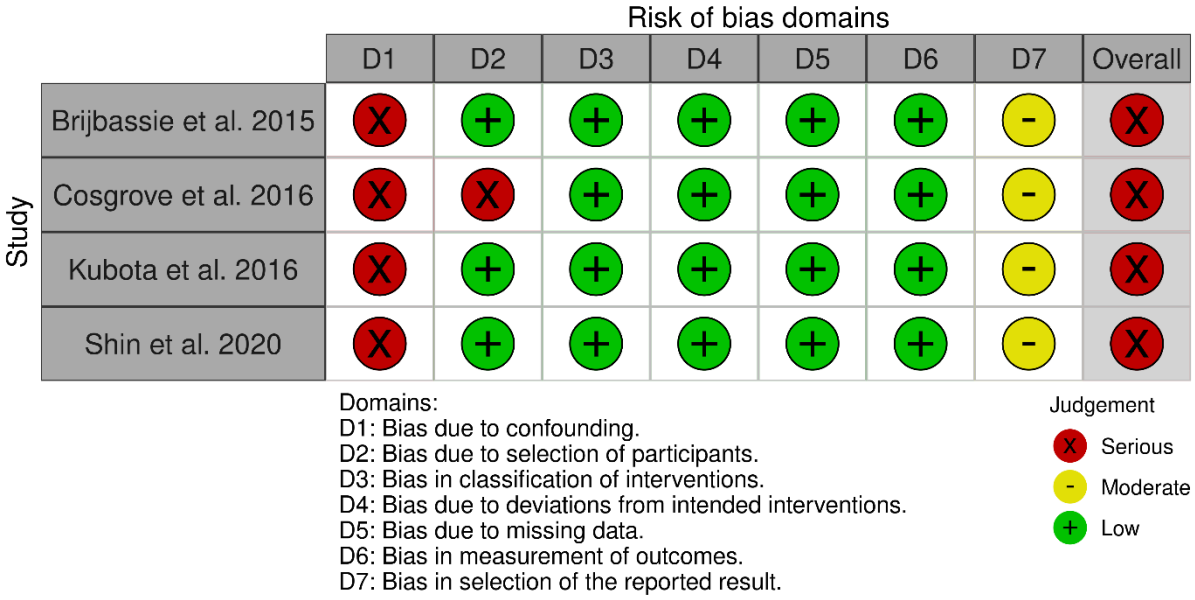

Figure S18. Risk of Bias Assessment (study-level judgments) in observational studies with the Risk Of Bias In Non-Randomized Studies - of Interventions (ROBINS-I). Outcome: cholangitis. [91, 93, 96, 99]

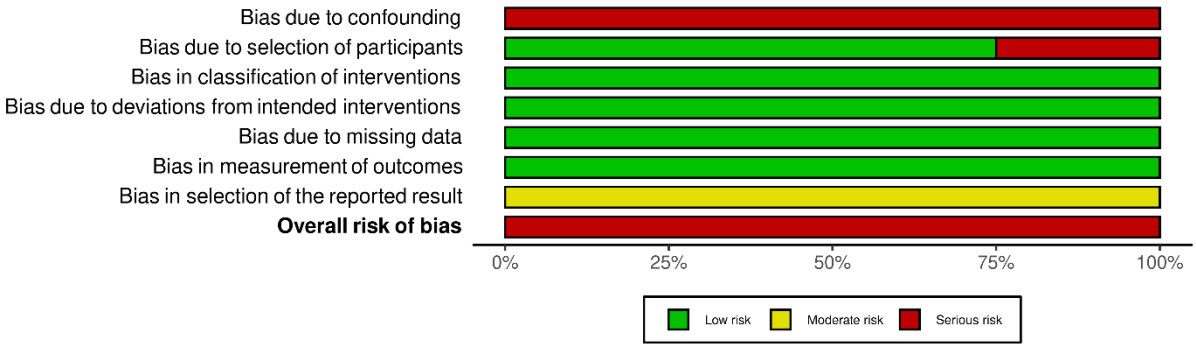

Figure S19. Risk of bias assessment (domain-level judgments) in observational studies with the Risk Of Bias In Non-Randomized Studies - of Interventions (ROBINS-I). Outcome: cholangitis. [91, 93, 96, 99]

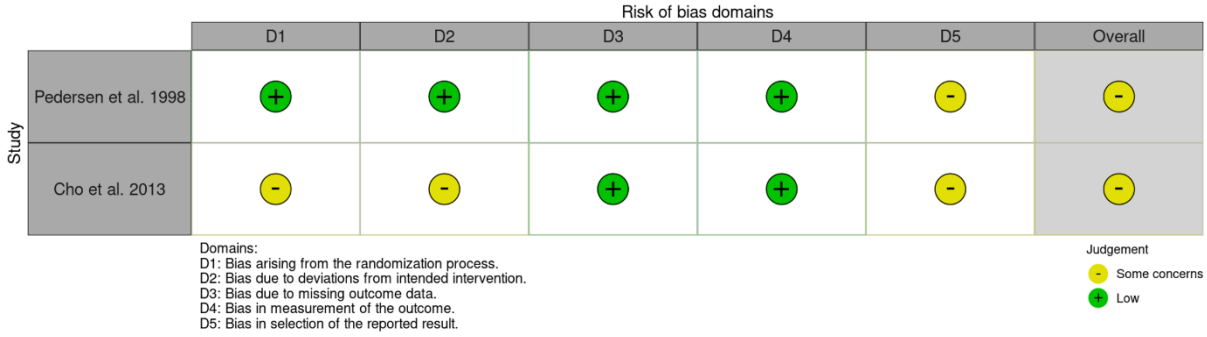

Figure S20. Risk of Bias Assessment (study-level judgments) with version 2 of the Cochrane Risk-of-Bias tool for randomized trials (RoB 2). Outcome: cholangitis. [92, 98]

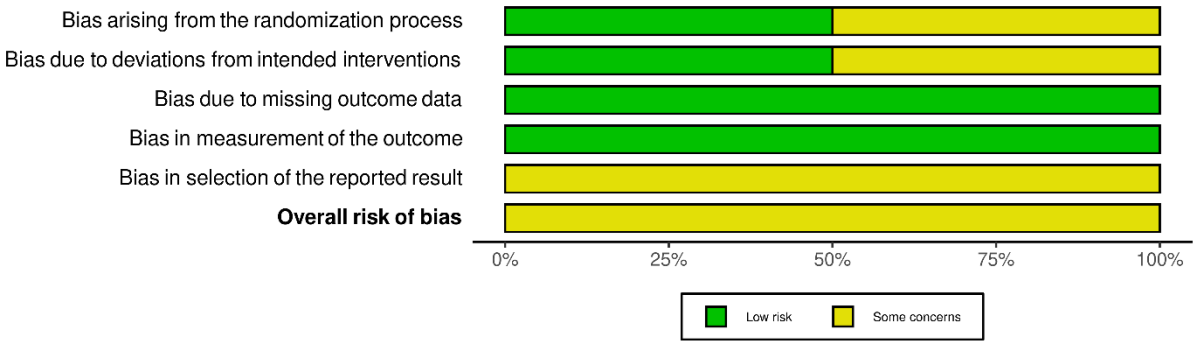

Figure S21. Risk of bias assessment (domain-level judgments) with version 2 of the Cochrane risk-of-bias tool for randomized trials (RoB 2). Outcome: cholangitis. [92, 98]

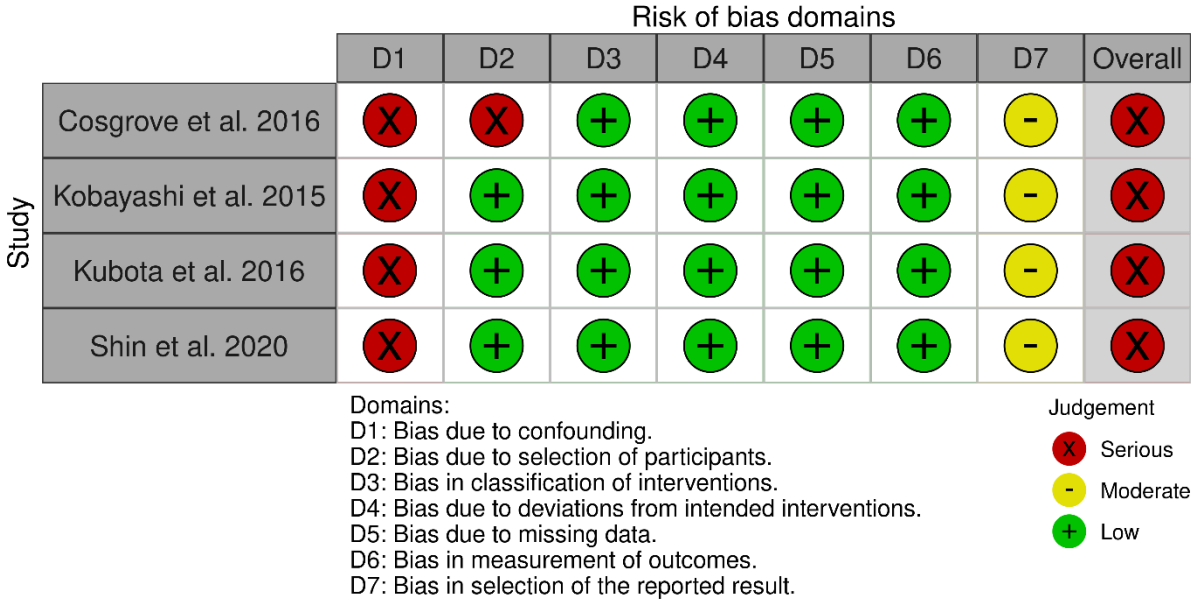

Figure S22. Risk of Bias Assessment (study-level judgments) in observational studies with the Risk Of Bias In Non-Randomized Studies - of Interventions (ROBINS-I). Outcome: pancreatitis. [93, 95, 96, 99]

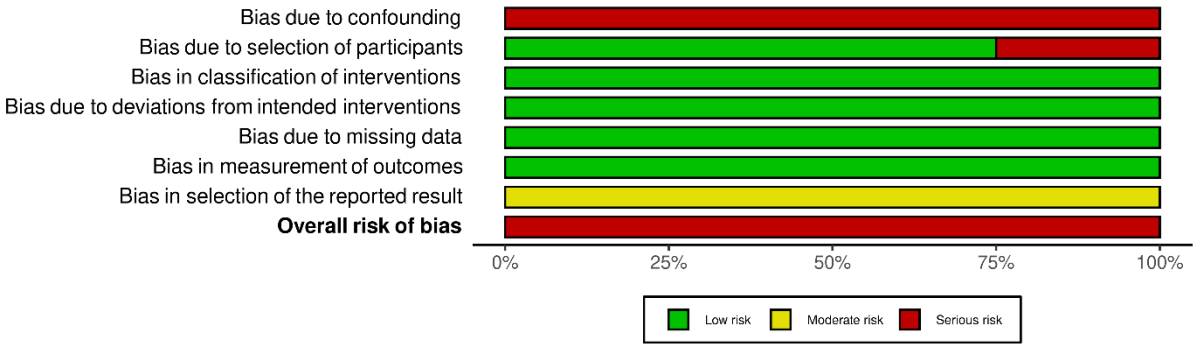

Figure S23. Risk of bias assessment (domain-level judgments) in observational studies with the Risk Of Bias In Non-Randomized Studies - of Interventions (ROBINS-I). Outcome: pancreatitis. [93, 95, 96, 99]

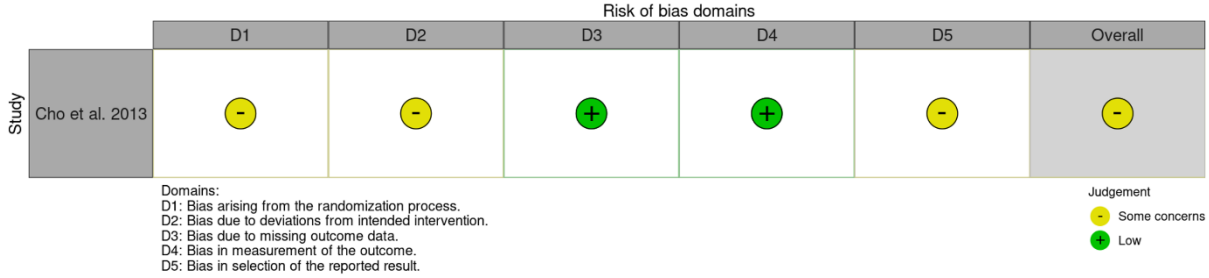

Figure S24. Risk of Bias Assessment (study-level judgments) with version 2 of the Cochrane Risk-of-Bias tool for randomized trials (RoB 2). Outcome: pancreatitis. [92]

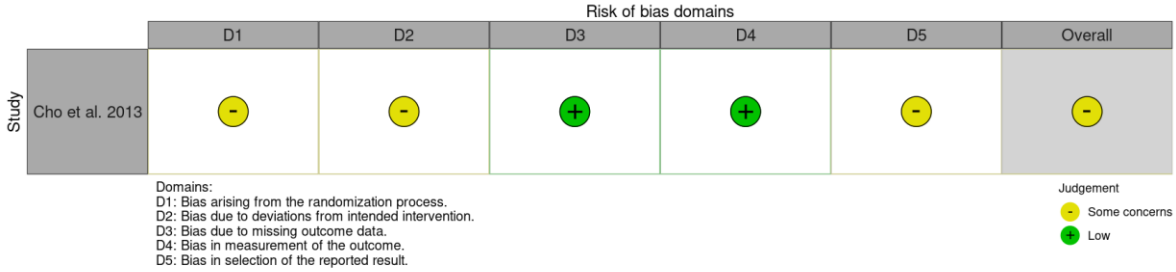

Figure S25. Risk of Bias Assessment (study-level judgements) with the version 2 of the Cochrane risk-of-bias tool for randomized trials (RoB 2). Outcome: Cholecystitis. [92]

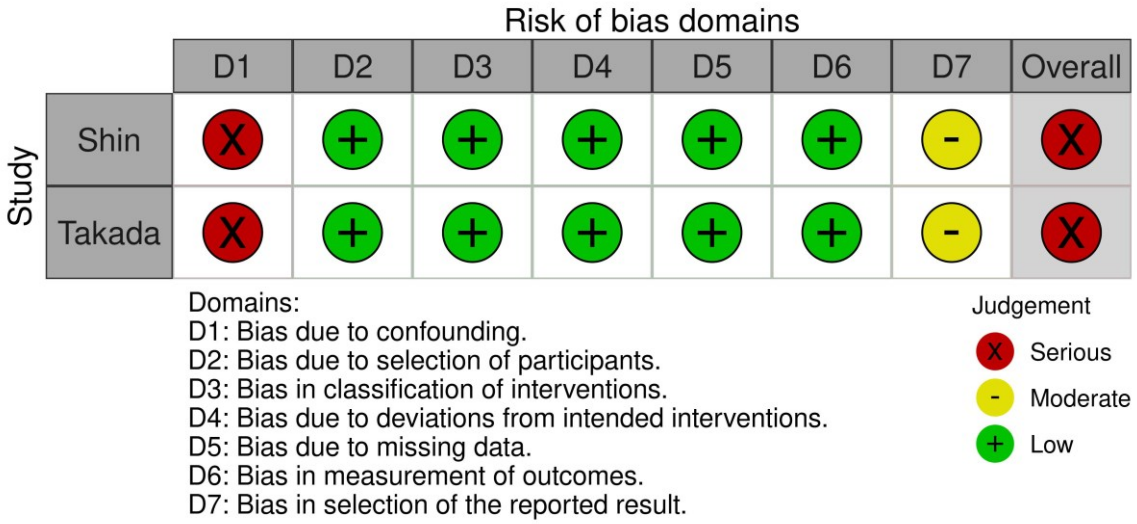

Figure S26. Risk of Bias Assessment (study-level judgements) with the Risk of Bias In Non-Randomized Studies - of Interventions (ROBINS-I). Outcome: Cholecystitis. [99, 100]

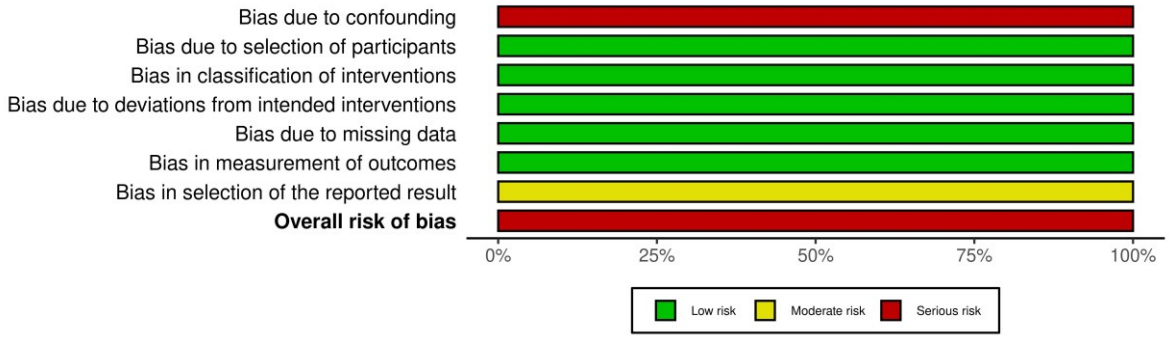

Figure S27. Risk of Bias Assessment (domain-level judgements) with the Risk of Bias In Non-Randomized Studies - of Interventions (ROBINS-I). Outcome: Cholecystitis. [99, 100]

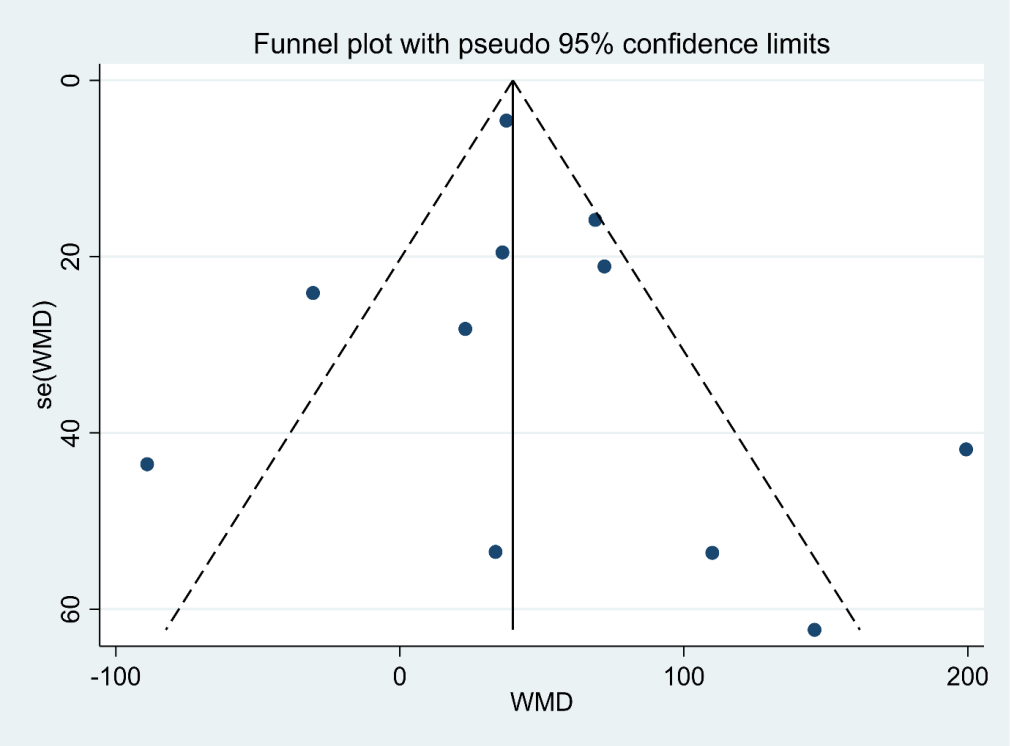

Figure S28. Funnel plot investigating publication bias for the outcome of stent patency (all included publications). Egger's test: p=0.591. [91-96, 98-100, 102, 103]

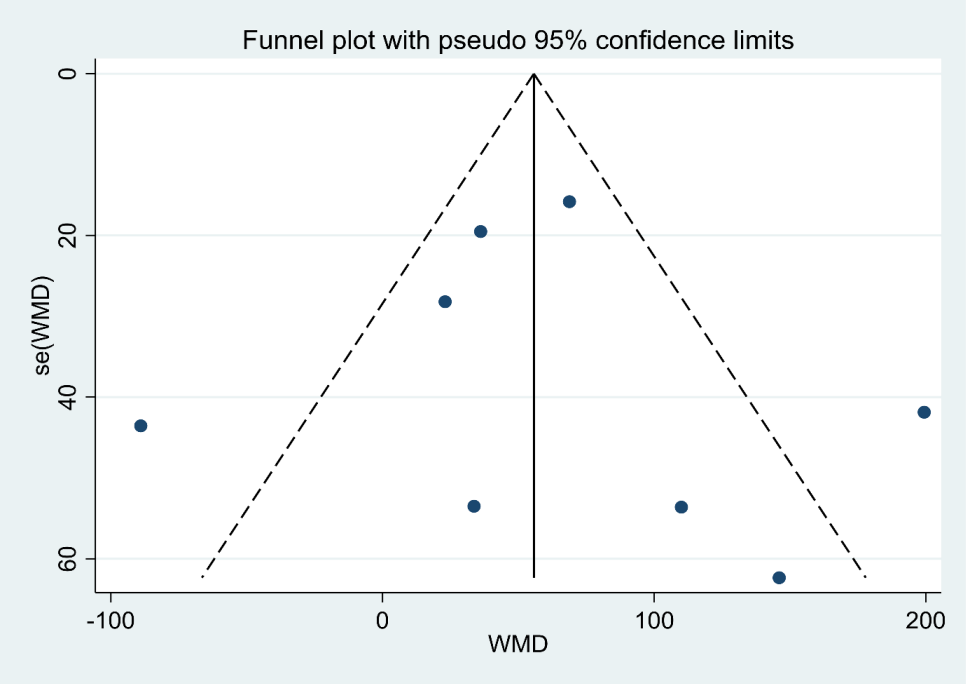

Figure S29. Funnel plot investigating publication bias for the outcome of stent patency (full-texts investigating malignant indication). [93-96, 98-100, 102]

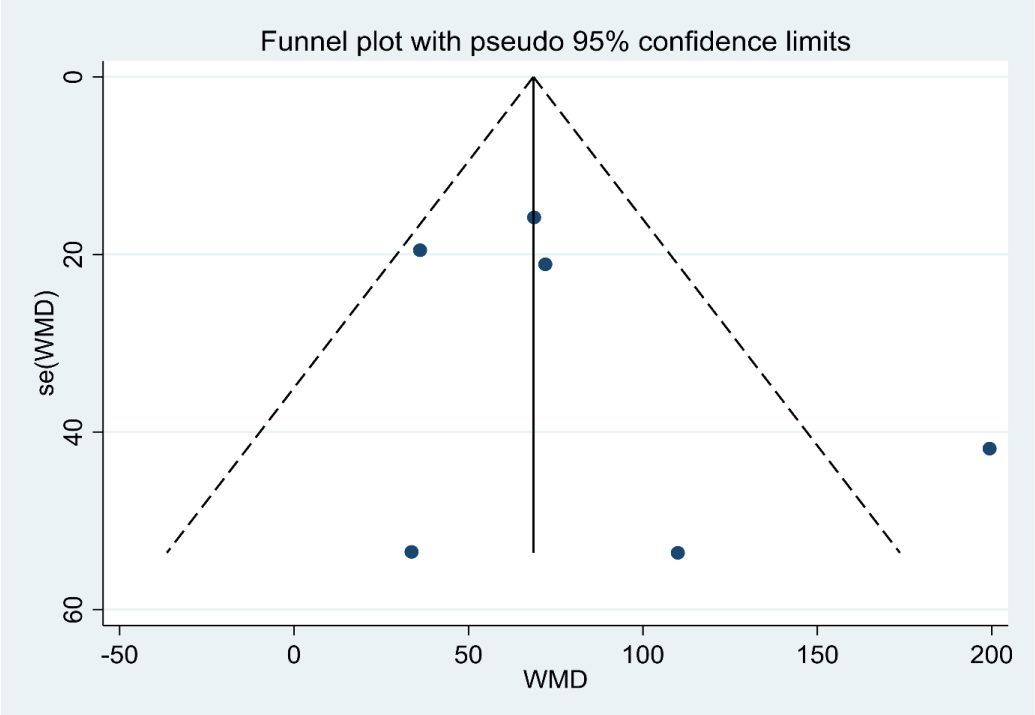

Figure S30. Funnel plot investigating publication bias for the outcome of stent patency (plastic stent). [94-96, 98, 102, 103]

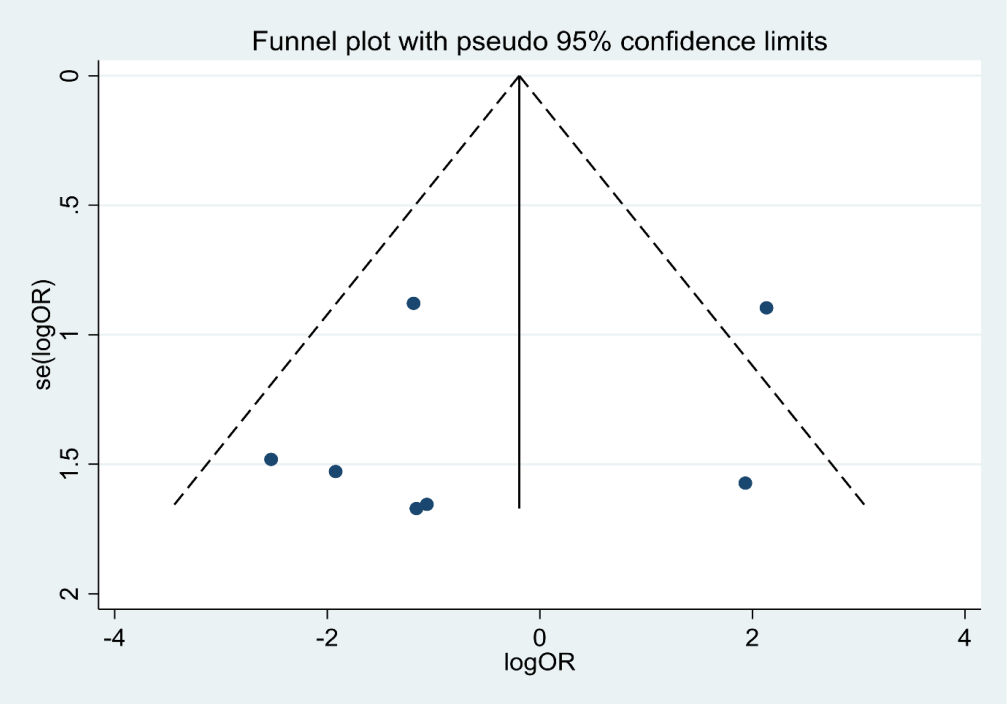

Figure S31. Funnel plot investigating publication bias for the outcome of stent migration rate (all publications). [92, 95-98, 100, 102]

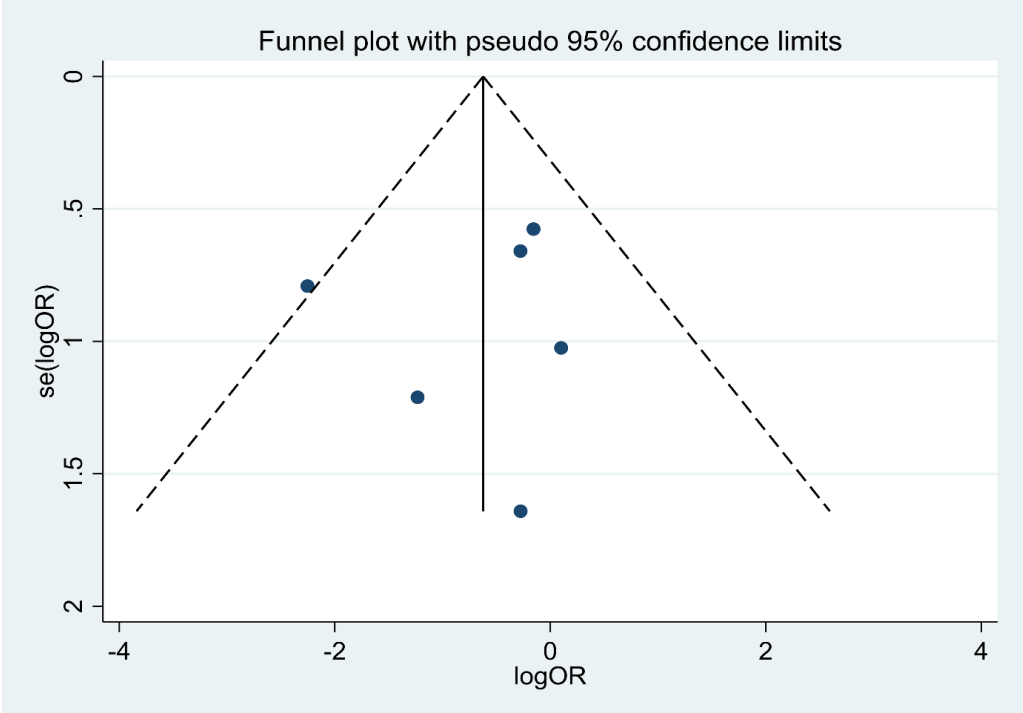

Figure S32. Funnel plot investigating publication bias for the outcome of post-ERCP cholangitis rate (all publications). [91-93, 96, 98, 99]

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