

**Transcatheter arterial embolization of nonvariceal gastrointestinal
bleeding with *n*-butyl cyanoacrylate or coils: A systematic review and
meta-analysis**

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Supplement Table S1. Literature search.

a. Library Search Strategy: Cochrane Library.

Search No	Search Strategy
#1	(GIB OR ((gastrointestinal OR esophageal OR oesophageal OR gastric OR duodenal OR gastroduodenal OR intestinal OR colonic OR rectal OR peptic) AND (bleed* OR re-bleed* OR rebleed* OR hemorrhag* OR haemorrhag* OR hematemes* OR haematemes* OR melena* OR melaena*))) AND (non-variceal OR nonvariceal OR arter*):ti,ab,kw
#2	(embolization* OR embolisation* OR embolism* OR embolotherap*):ti,ab,kw
#3	(NBCA OR "N-Butyl-Cyanoacrylate" OR "N-Butyl-2-Cyanoacrylate" OR *coil*):ti,ab,kw
#4	#1 AND #2 AND #3 AND english:la
#6	#4 CDSR

b. Library Search Strategy: PubMed.

Search No	Search Strategy
#01	("Gastrointestinal Hemorrhage"[MeSH] OR Hematemesis[MeSH] OR Melena[MeSH] OR GIB[TIAB] OR ((gastrointestinal[TIAB] OR esophageal[TIAB] OR oesophageal[TIAB] OR gastric[TIAB] OR duodenal[TIAB] OR gastroduodenal[TIAB] OR intestinal[TIAB] OR colonic[TIAB] OR rectal[TIAB] OR peptic[TIAB])) AND (bleed*[TIAB] OR "re-bleed"[TIAB] OR rebleed*[TIAB] OR hemorrhag*[TIAB] OR haemorrhag*[TIAB] OR hematemes*[TIAB] OR haematemes*[TIAB] OR melena*[TIAB] OR melaena*[TIAB])) AND ("non-variceal"[TIAB] OR nonvariceal[TIAB] OR arter*[TIAB])
#02	"Embolization, Therapeutic"[MeSH] OR embolization*[TIAB] OR embolisation*[TIAB] OR embolism*[TIAB] OR embolotherap*[TIAB]
#03	Enbucrilate[MeSH] OR NBCA[TIAB] OR "N-Butyl-Cyanoacrylate"[TIAB] OR "N-Butyl-2-Cyanoacrylate"[TIAB] OR coil*[TIAB] OR microcoil*[TIAB]
#04	2000/01:2023/08[DP] AND english[LA]
#05	#1 AND #2 AND #3 AND #4
#06	#5 AND ("Meta-Analysis"[PT] OR "Meta-Analysis as Topic"[Mesh] OR "meta-analysis"[TIAB])
#07	#5 AND ("Cochrane Database Syst Rev"[TA] OR "Systematic Review"[PT] OR "Systematic Reviews as Topic"[Mesh] OR "systematic review"[TIAB])
#08	#5 AND ("Practice Guideline"[PT] OR "Practice Guidelines as Topic"[Mesh] OR "Consensus"[Mesh] OR "Consensus Development Conferences as Topic"[Mesh] OR "Consensus Development Conference"[PT] OR guideline*[TI] OR consensus[TI])
#09	#6 OR #7 OR #8
#10	#5 AND ("Randomized Controlled Trial"[PT] OR "Randomized Controlled Trials as Topic"[Mesh] OR (random*[TIAB] NOT medline[SB]))

#11	#5 AND ("Clinical Trial"[PT] OR "Clinical Trials as Topic"[Mesh] OR "Observational Study"[PT] OR "Observational Studies as Topic"[Mesh] OR ((clinical trial*[TIAB] OR case control*[TIAB] OR case comparison*[TIAB]) NOT medline[SB]))
#12	(#10 OR #11) NOT #9
#13	#5 AND ("Epidemiologic Methods"[Mesh] OR "Comparative Study"[PT] OR "Multicenter Study"[PT] OR "Validation Study"[PT] OR (("survival analysis"[TIAB] OR cohort*[TIAB] OR "comparative stud*"[TIAB] OR "follow-up stud*"[TIAB] OR "prospective stud*"[TIAB] OR "Retrospective study*"[TIAB] OR sensitivit*[TIAB] OR specificit*[TIAB] OR "retrospective analytical stud*"[TIAB] OR "Retrospective Evaluation"[TIAB]) NOT medline[SB]))
#14	#13 NOT (#9 OR #12)

c. Library Search Strategy: Embase.

No.	Query
#1	'esophagus hemorrhage'/exp OR 'gastrointestinal hemorrhage'/exp gastric artery'/exp OR 'gastroepiploic artery'/exp OR 'mesenteric artery'/exp OR 'rectal artery'/exp OR gastro\$intestin*:ab,ti OR \$esophag*:ab,ti OR gastric*:ab,ti OR gastritis:ab,ti OR stomach*:ab,ti OR duoden*:ab,ti OR gastro\$duoden*:ab,ti OR
#2	intestin*:ab,ti OR jejunum:ab,ti OR jejunal:ab,ti OR ileum:ab,ti OR ileal:ab,ti OR coliti*:ab,ti OR enteroclit*:ab,ti OR colon*:ab,ti OR rectal:ab,ti OR rectum:ab,ti OR proctorrhag*:ab,ti OR proctitis:ab,ti OR rectocoli*:ab,ti OR rectitis:ab,ti OR rectorrhag*:ab,ti OR peptic*:ab,ti hematemesis'/exp OR 'hematochezia'/exp OR bleed*:ab,ti OR 're-bleed*':ab,ti OR rebleed*:ab,ti OR 'blood flow':ab,ti OR
#3	bloodflow:ab,ti OR h\$emorrhag*:ab,ti OR h\$ematemes*:ab,ti OR mel\$en*:ab,ti OR h\$ematoch*:ab,ti
#4	#2 AND #3
#5	#1 OR #4
#6	'aneurysm'/exp OR 'non-variceal':ab,ti OR nonvariceal:ab,ti OR arter*:ab,ti
#7	#5 AND #6
#8	artificial embolization'/exp OR embolization*:ab,ti OR embolisation*:ab,ti OR embolism*:ab,ti OR embolotherap*:ab,ti OR embolus*:ab,ti
#9	'enbucrilate'/exp
#10	nbca:ab,ti OR 'n butyl 2 cyanoacrylate*':ab,ti OR 'n butyl cyanoacrylate*':ab,ti OR 'n-butylcyanoacrylate':ab,ti
#11	#9 AND #10
#12	'embolization coil'/exp OR coil*:ab,ti OR microcoil*:ab,ti
#13	#11 OR #12
#14	#7 AND #8 AND #13 AND 'human'/exp AND english:la AND [2000-2023]/py

Supplement Table S2. Primary analyses and sensitivity analyses of transcatheter arterial embolization for nonvariceal upper gastrointestinal bleeding.

Clinical success rate		
Studies included	No. of studies	Clinical success rate (95% CI)
All articles	8	73.0 (65.3–79.6)
Articles with at least 10 cases	7	72.9 (64.1–80.2)
Technical success rate		
Studies included	No. of studies	Technical success rate (95% CI)
All articles	21	94.9 (91.6–97.0)
Articles with at least 10 cases	17	95.5 (91.7–97.6)
30-day rebleeding rate		
Studies included	No. of studies	30-day rebleeding rate (95% CI)
All articles	10	25.0 (19.5–31.3)
Articles with at least 10 cases	9	24.8 (19.0–31.7)
Major complication rate		
Studies included	No. of studies	Major complication rate (95% CI)
All articles	13	3.5 (1.7–7.1)
Articles with at least 10 cases	11	3.1 (1.3–6.9)
30-day overall mortality rate		
Studies included	No. of studies	30-day overall mortality rate (95% CI)
All articles	10	20.7 (13.2–31.1)
Articles with at least 10 cases	9	20.7 (12.6–32.5)

CI, confidence interval; No., number

Supplement Table S3. Primary analyses and sensitivity analyses of transcatheter arterial embolization for nonvariceal lower gastrointestinal bleeding.

Clinical success rate		
Studies included	No. of studies	Clinical success rate (95% CI)
All articles	15	76.5 (70.5–81.5)
Articles with at least 10 cases	9	75.7 (68.2–81.9)
Technical success rate		
Studies included	No. of studies	Technical success rate (95% CI)
All articles	17	91.4 (87.7–94.0)
Articles with at least 10 cases	11	91.9 (86.2–95.3)
30-day rebleeding rate		
Studies included	No. of studies	30-day rebleeding rate (95% CI)
All articles	16	17.1 (13.4–21.6)
Articles with at least 10 cases	10	17.6 (12.7–24.0)
Major complication rate		
Studies included	No. of studies	Major complication rate (95% CI)
All articles	14	10.2 (7.2–13.8)
Articles with at least 10 cases	7	10.3 (5.7–18.0)
30-day overall mortality rate		
Studies included	No. of studies	30-day overall mortality rate (95% CI)
All articles	12	11.5 (6.1–20.5)
Articles with at least 10 cases	7	11.4 (3.8–29.4)

CI, confidence interval; No., number

Supplement Table S4. Sensitivity analyses of subgroup analyses of transcatheter arterial embolization for nonvariceal upper gastrointestinal bleeding.

	Proportion (95% CI)	I^2	p_{subgroup}
Technical success rate (k = 17)			0.054
Coils (k = 7)	0.920 (0.761–0.977)	52.2%	
NBCA (k = 10)	0.972 (0.955–0.983)	0%	
30-day rebleeding rate (k = 9)			0.682
Coils (k = 2)	0.227 (0.007–0.927)	12.0%	
NBCA (k = 7)	0.252 (0.179–0.345)	42.0%	
Major complication rate (k = 11)			0.178
Coils (k = 3)	0.018 (0.007–0.047)	0%	
NBCA (k = 8)	0.036 (0.012–0.106)	68.6%	
30-day overall mortality rate (k = 9)			0.104
Coils (k = 2)	0.141 (0.003–0.914)	0.9%	
NBCA (k = 7)	0.244 (0.146–0.378)	50.7%	

CI, confidence interval; NBCA, *n*-butyl cyanoacrylate

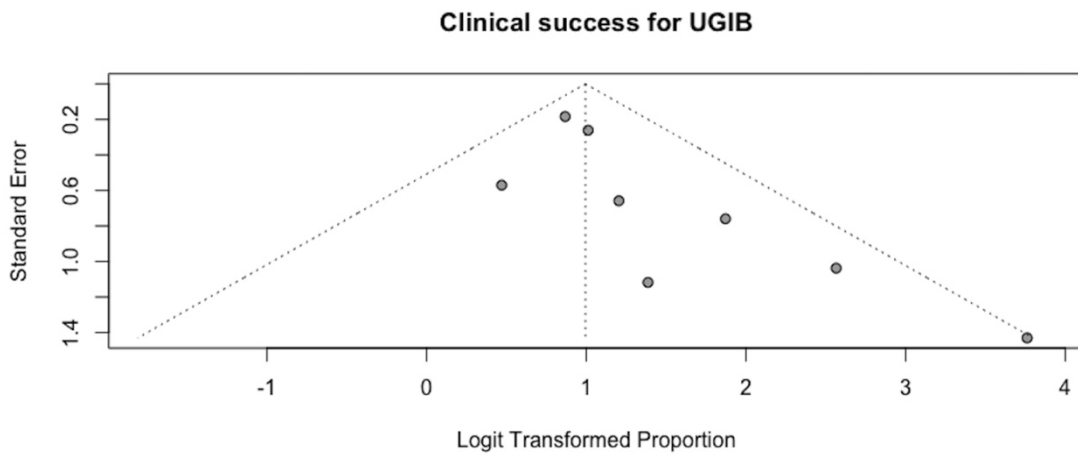
Supplement Table S5. Sensitivity analyses of subgroup analyses of transcatheter arterial embolization for nonvariceal lower gastrointestinal bleeding.

	Proportion (95% CI)	<i>I</i> ²	<i>p</i> _{subgroup}
Clinical success rate (k =9)			0.820
Coils (k = 5)	0.765 (0.610–0.872)	7.1%	
NBCA (k = 4)	0.751 (0.594–0.861)	12.6%	
Technical success rate (k =11)			<0.001
Coils (k = 8)	0.893 (0.822–0.938)	0.0%	
NBCA (k = 3)	0.977 (0.949–0.990)	0%	
30-day rebleeding rate (k =10)			0.678
Coils (k = 6)	0.187 (0.105–0.310)	16.3%	
NBCA (k = 4)	0.165 (0.08–0.303)	5.8%	
Major complication rate (k =7)			0.100
Coils (k = 4)	0.049 (0.009–0.225)	0%	
NBCA (k = 3)	0.122 (0.044–0.297)	0%	
30-day overall mortality rate (k = 7)			0.611
Coils (k = 4)	0.092 (0.020–0.334)	19.6%	
NBCA (k = 3)	0.148 (0.003–0.900)	80.3%	

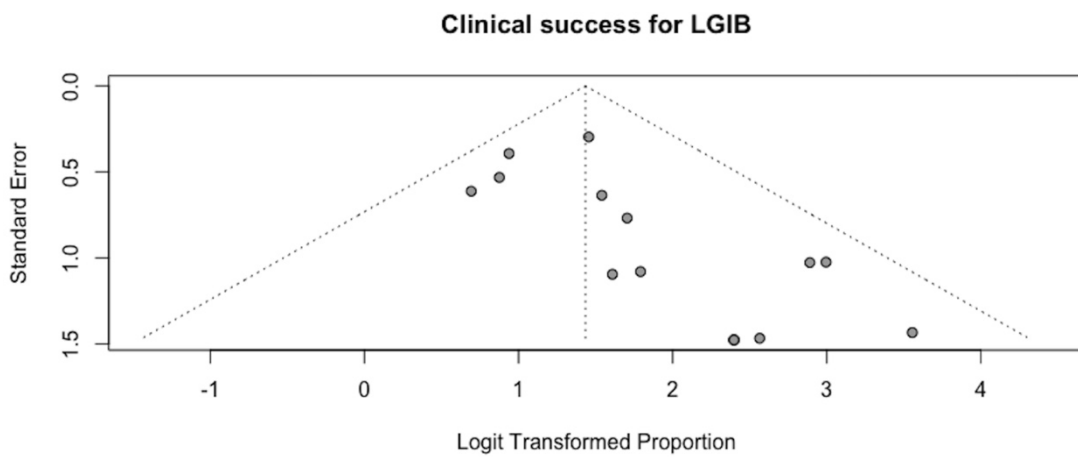
CI, confidence interval; NBCA, *n*-butyl cyanoacrylate

Supplement Fig. S1. Funnel plots of the pooled clinical success rates of transcatheter arterial embolization (TAE) for nonvariceal upper gastrointestinal bleeding (UGIB) and lower gastrointestinal bleeding (LGIB).

a. The funnel plot of the pooled clinical success rate of TAE for UGIB.

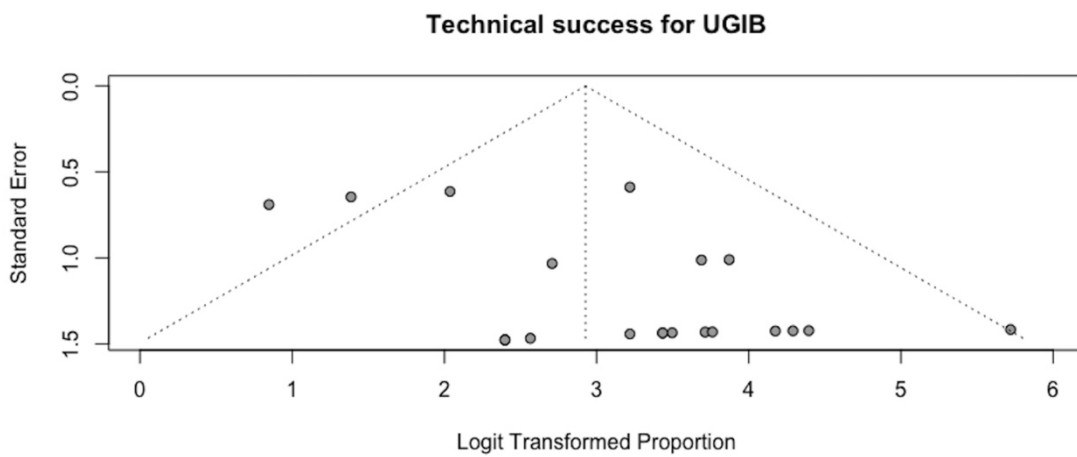


b. The funnel plot of the pooled clinical success rates of TAE for LGIB.

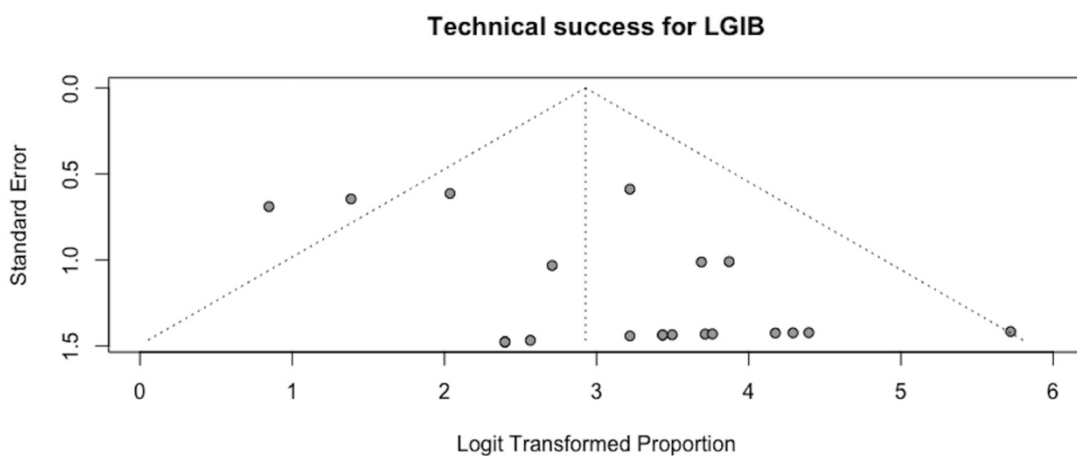


Supplement Fig. S2. Funnel plots of the pooled secondary outcomes of transcatheter arterial embolization (TAE) for nonvariceal upper gastrointestinal bleeding (UGIB) and lower gastrointestinal bleeding (LGIB).

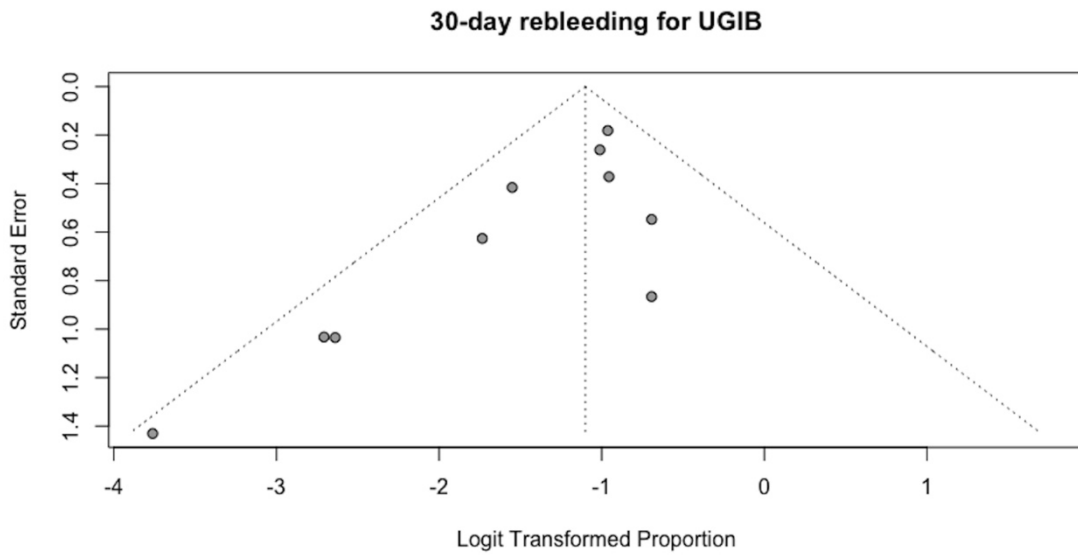
a. The funnel plot of the pooled technical success rate of TAE for UGIB.



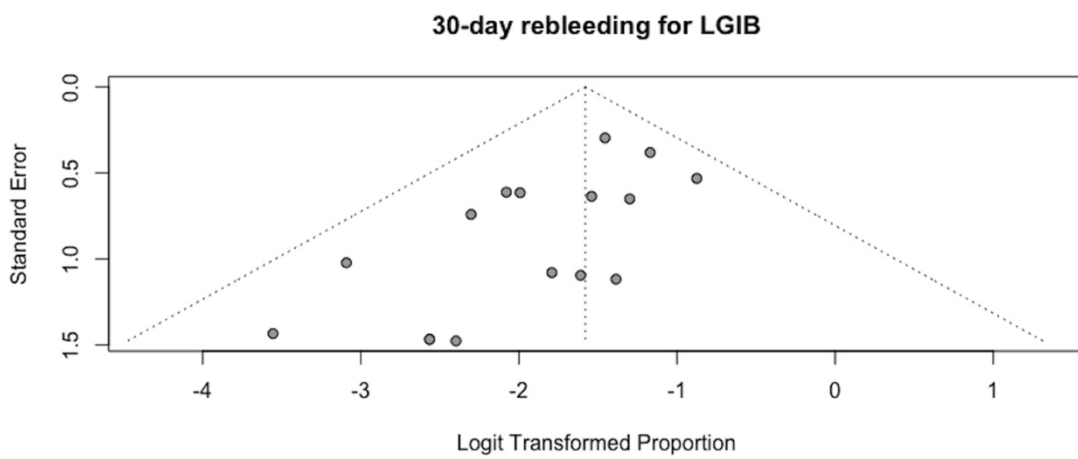
b. The funnel plot of the pooled technical success rate of TAE for LGIB.



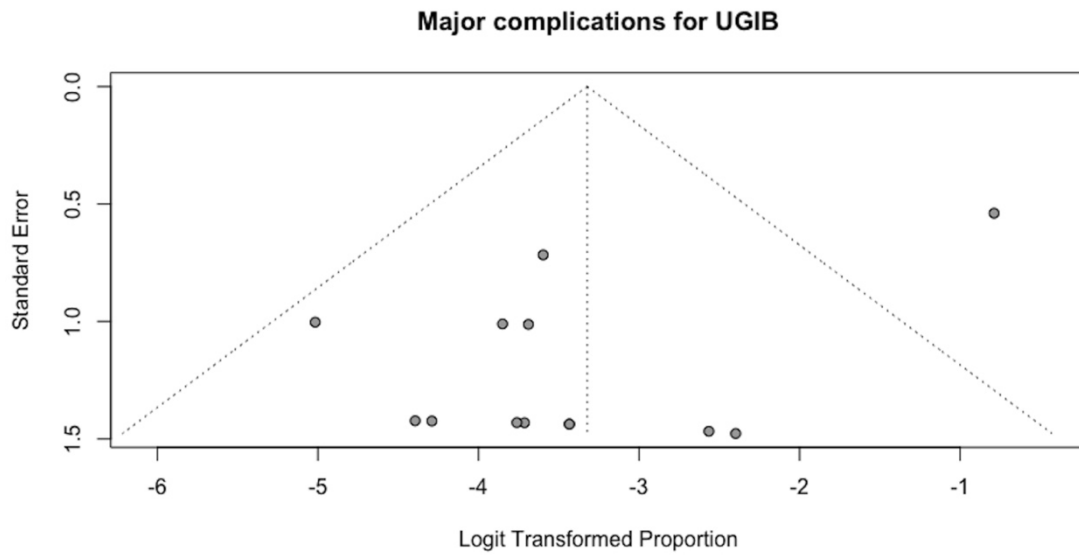
c. The funnel plot of the pooled 30-day rebleeding rate of TAE for UGIB.



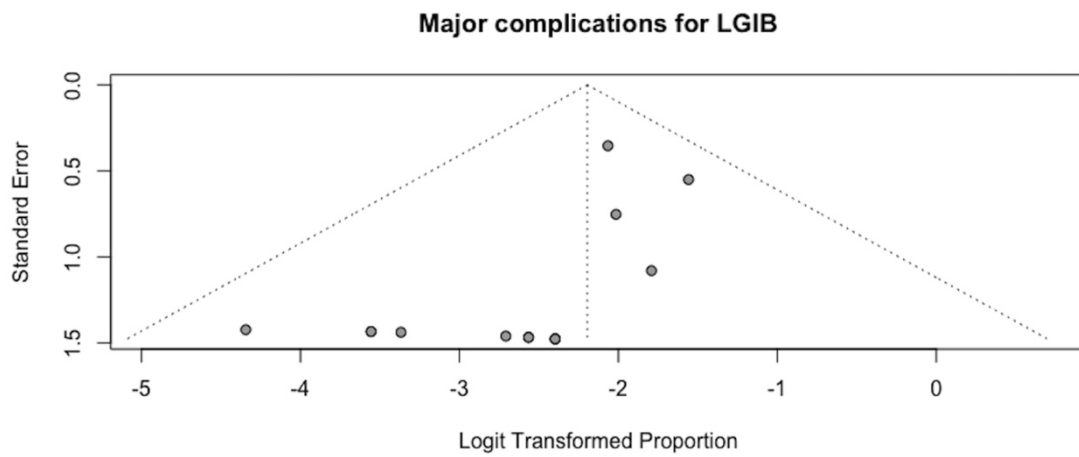
d. The funnel plot of the pooled 30-day rebleeding rate of TAE for LGIB.



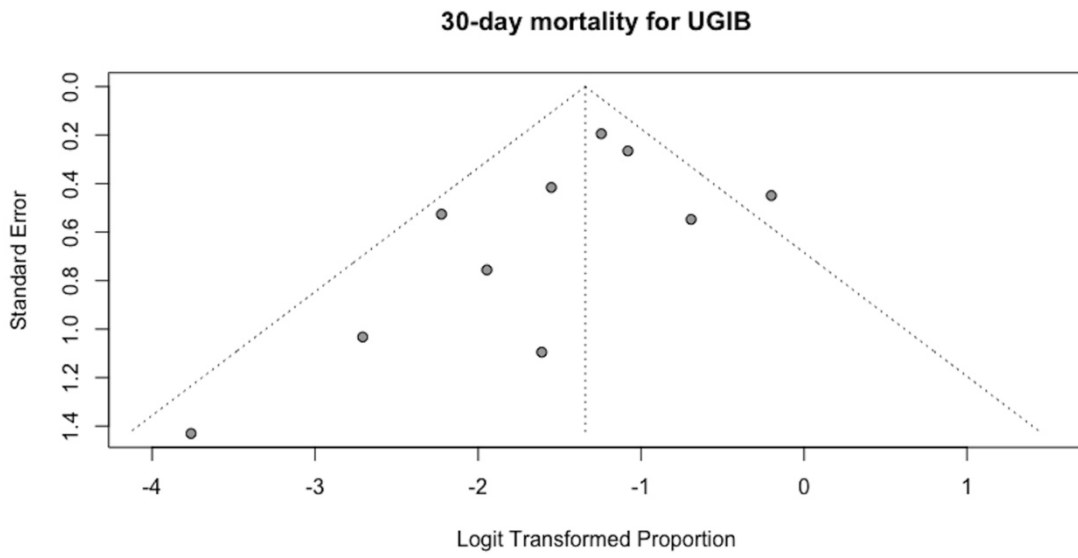
e. The funnel plot of the pooled major complication rate of TAE for UGIB.



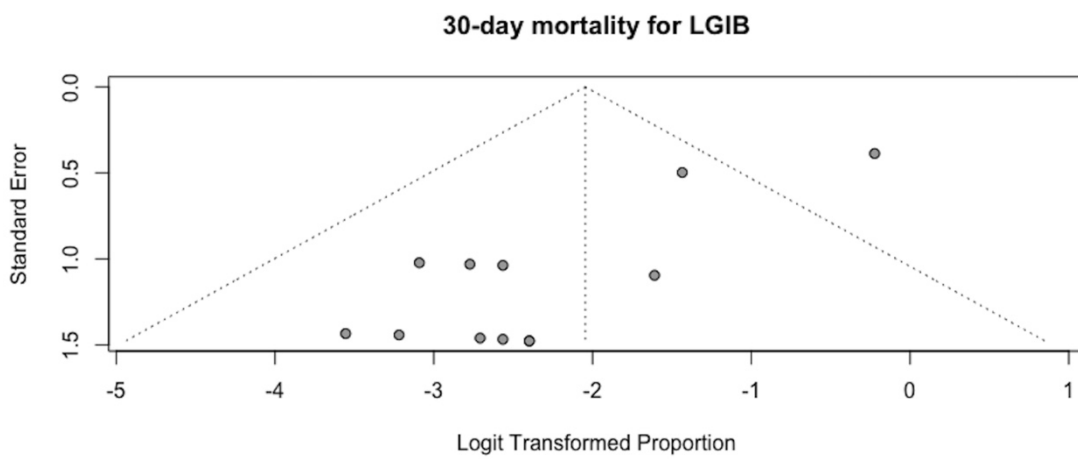
f. The funnel plot of the pooled major complication rate of TAE for LGIB.



g. The funnel plot of the pooled 30-day overall mortality rate of TAE for UGIB.

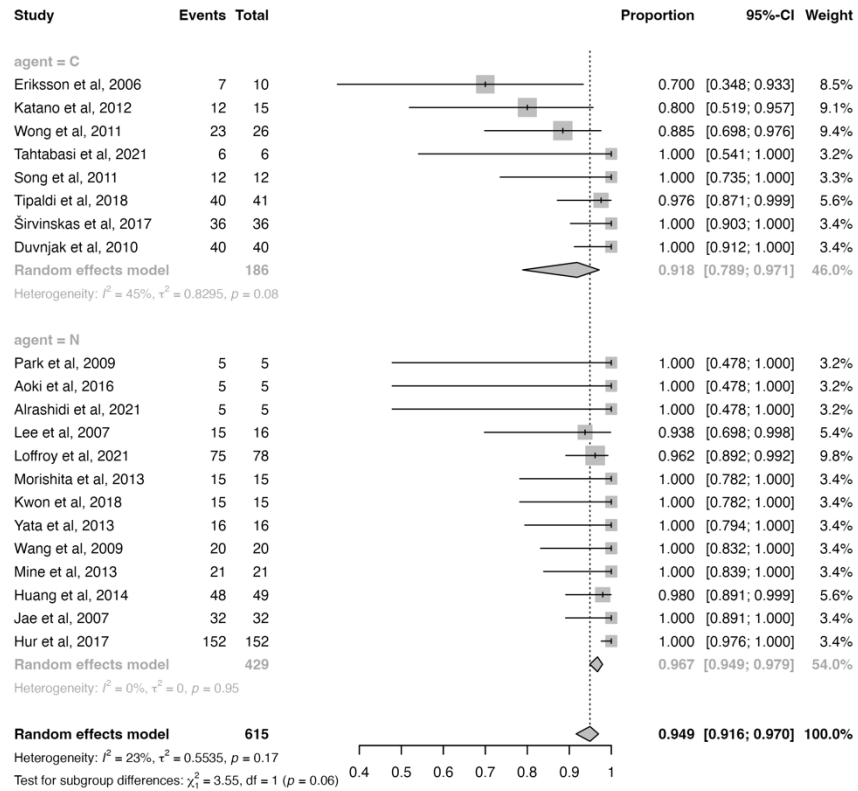


h. The funnel plot of the pooled 30-day overall mortality rate of TAE for LGIB.

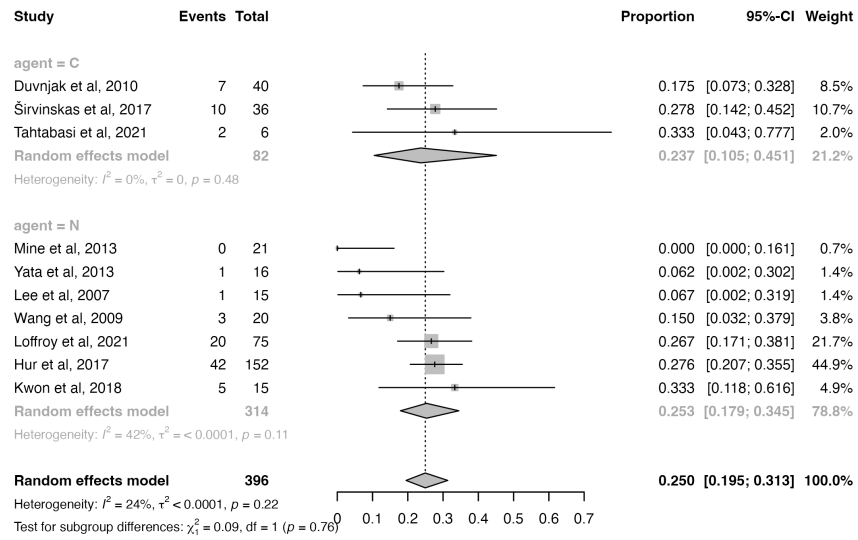


Supplement Fig. S3. Forest plots of the subgroup analyses of transcatheter arterial embolization (TAE) for nonvariceal upper gastrointestinal bleeding (UGIB).

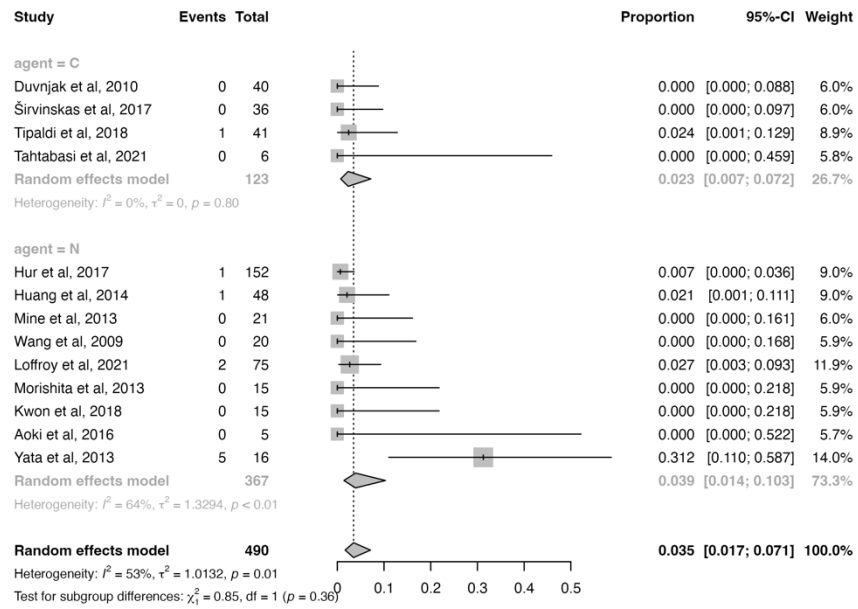
a. The forest plot of the pooled technical success rate of TAE for UGIB with coils (C) and NBCA (N).



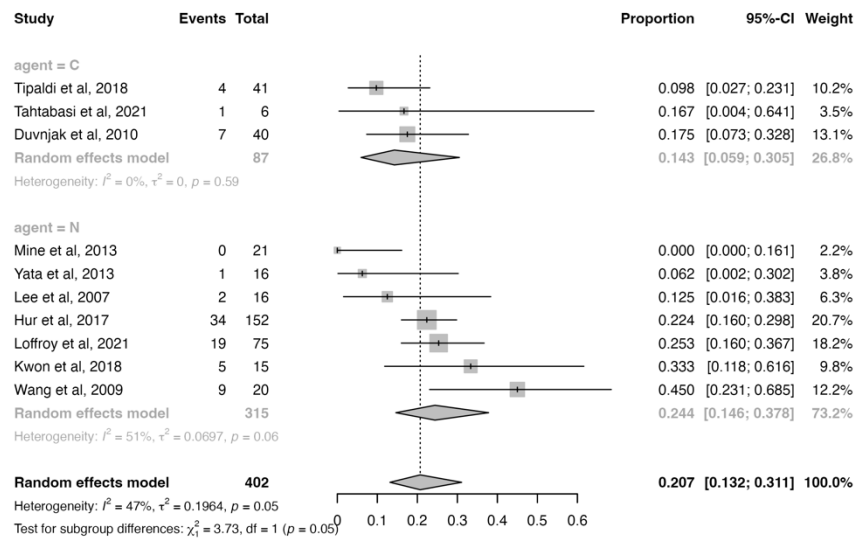
b. The forest plot of the pooled 30-day rebleeding rate of TAE for UGIB with coils (C) and NBCA (N).



c. The forest plot of the pooled major complication rate of TAE for UGIB with coils (C) and NBCA (N).

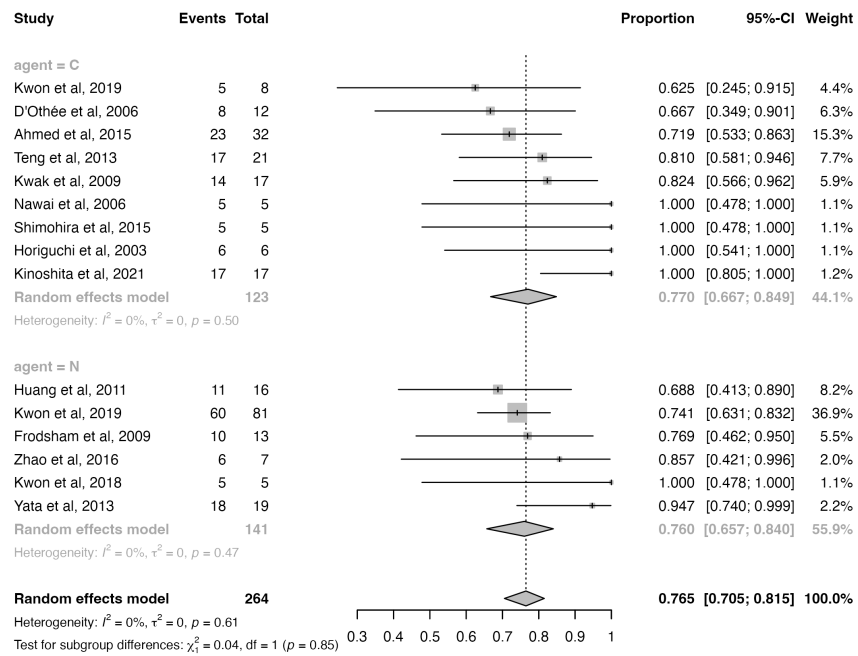


d. The forest plot of the pooled 30-day overall mortality rate of TAE for UGIB with coils (C) and NBCA (N).

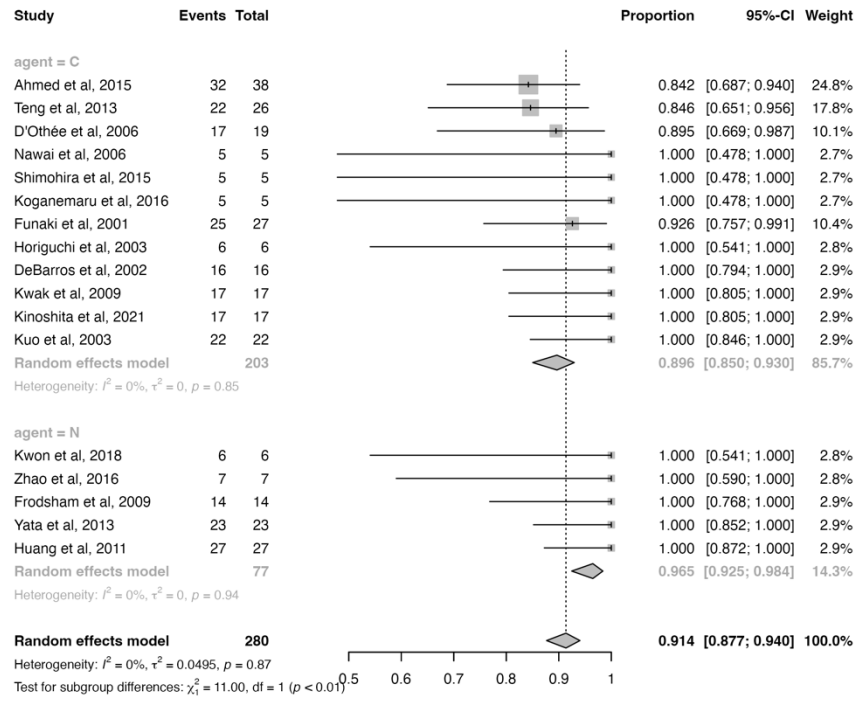


Supplement Fig. S4. Forest plots of the subgroup analyses of transcatheter arterial embolization (TAE) for nonvariceal lower gastrointestinal bleeding (LGIB).

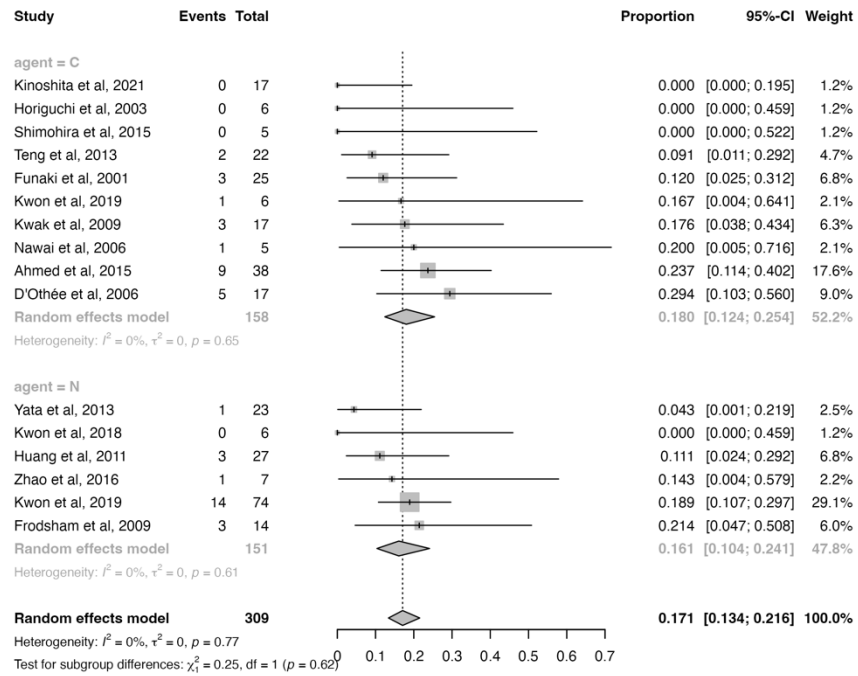
a. The forest plot of the pooled clinical success rate of TAE for LGIB with coils (C) and NBCA (N).



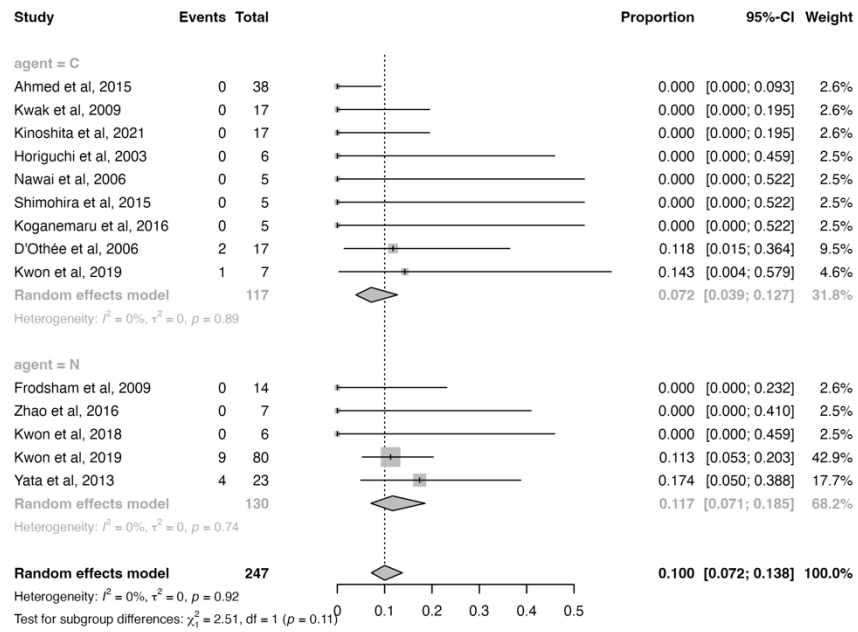
b. The forest plot of the pooled technical success rate of TAE for LGIB with coils (C) and NBCA (N).



c. The forest plot of the pooled 30-day rebleeding rate of TAE for LGIB with coils (C) and NBCA (N).



d. The forest plot of the pooled major complication rate of TAE for LGIB with coils (C) and NBCA (N).



e. The forest plot of the pooled 30-day overall mortality rate of TAE for LGIB with coils (C) and NBCA (N).

