

Supplementary Materials

6 mm versus 8 mm covered stent for TIPS creation in patients with cirrhotic portal hypertension

Supplementary Tables

Study (Year)	Design	Country	N	Follow-up	Age (years)	Male (%)	Main etiology	Child-Pugh score	MELD score	Indication	Stent diameters compared (n per group)	Pre-TIPS PPG (mm Hg)
Zhang 2026	Open-label RCT, single-center	China (Nanjing)	144	Median 24.3 mo	Median 63 (IQR 53–68)	57.6	HBV/HCV 46.5%, AIH/PBC 14.6%, alcohol 13.2%	Median 8 (IQR 7–8); B 78.5%	Median 10 ± 2	Secondary prophylaxis of variceal bleeding	6 mm (n=72) vs 8 mm (n=72)	Mean 23.5 ± 5.0
Yao 2022	Retrospective case-control, PSM, single-center	China (Wuhan)	66 (PSM); 96 originally	Median 24 mo (range 1–56)	Mean 52.7 ± 9.5	65.2	HBV 65.2%, HCV 13.6%, schistosoma 10.6%, alcohol 7.6%	Mean 7.4 ± 1.5; B 61.4%	Median 9.8 ± 2.4	Variceal bleeding in patients with prior splenectomy	6 mm balloon-dilated 8 mm stent (n=33) vs 8 mm balloon-dilated 8 mm stent (n=33)	Mean 26.7 ± 5.2
Liu 2021	Retrospective case-control, single-center	China (Wuhan)	134	Median 20.5 mo (range 12–42)	Mean 54.2 ± 10.9	61.9	HBV 50.0%, HCV 11.9%, schistosoma 13.4%, alcohol 6.7%	Mean 7.6 ± 1.7; B 59.7%	Median 11.3 ± 3.5	Variceal bleeding (acute or secondary prophylaxis)	6 mm balloon-dilated 8 mm stent (n=73) vs 8 mm balloon-dilated 8 mm stent (n=61)	Mean 26.5 ± 5.4
Xia 2024	Retrospective,	China	1,688 (184	Median 32.7	Median 52	64.3	Viral hepatitis	Median 7 (IQR	Median 11	Secondary	6 mm (n=95) vs 8 mm	Median 24

Study (Year)	Design	Country	N	Follow-up	Age (years)	Male (%)	Main etiology	Child-Pugh score	MELD score	Indication	Stent diameters compared (n per group)	Pre-TIPS PPG (mm Hg)
	multicenter (6 centers)		PSM)	mo (IQR 17.2–62.5)	(IQR 44–60)		67.7%	6–8)	(IQR 9–13)	prophylaxis of variceal bleeding	(n=1,504) vs 10 mm (n=89)	(IQR 20–29)
Yan 2023	Retrospective case-control, PSM, single-center	China (Guangzhou)	116 (PSM); 245 originally	2-year outcomes reported	Mean 56.9 ± 9.6	69.0	HBV 88.8%, HCV 6.0%	Mean 7.4 ± 1.6	Mean 8.1 ± 4.5	Variceal bleeding in patients with small liver volume	6 mm (n=58) vs 8 mm (n=58)	Mean 22.1 ± 6.7

Supplementary Table 1. Baseline characteristics of the included studies. AIH, autoimmune hepatitis; HBV, hepatitis B virus; HCV, hepatitis C virus; IQR, interquartile range; MELD, Model for End-Stage Liver Disease; PBC, primary biliary cirrhosis; PPG, portal pressure gradient; PSM, propensity score matching; RCT, randomized controlled trial; SD, standard deviation; TIPS, transjugular intrahepatic portosystemic shunt.

Study	Selection (max 4)	Comparability (max 2)	Outcome (max 3)	Total /9	Quality
Liu 2021	4	2	3	9	Good
Yan 2023	4	2	3	9	Good
Xia 2024	4	2	3	9	Good
Yao 2022	4	2	3	9	Good

Supplementary Table 2. Newcastle-Ottawa Scale scoring of the four included cohort studies.

Supplementary Table 3. Subgroup analysis by intervention type (random-effects risk ratios) for all outcomes. † Underdilated subgroup based on a single study (Liu 2021); estimate imprecise and exploratory. No test for subgroup differences was significant (all $P \geq 0.17$).

Outcome	True 6-mm stent RR (95% CI)	Underdilated 8- mm RR (95% CI)	P, subgroup difference
Any hepatic encephalopathy	0.61 (0.44–0.85)	0.40 (0.21–0.75) †	0.25
Overt HE	0.61 (0.41–0.90)	0.72 (0.19–2.69)	0.81
Grade I–II HE	0.65 (0.43–0.99)	0.45 (0.20–0.98) †	0.40
Grade III–IV HE	0.62 (0.31–1.24)	0.31 (0.09–1.13) †	0.36
PPG < 12 mmHg achieved	0.91 (0.77–1.08)	0.93 (0.75–1.14) †	0.91
Variceal rebleeding (2 y)	1.37 (1.02–1.86)	0.75 (0.33–1.69)	0.17
Shunt dysfunction	1.04 (0.73–1.47)	0.72 (0.35–1.47)	0.36

3	1 RCT, 2 NRSI	serious ^a	not serious	not serious	serious ^b	none	203	191	RR 0.53 (0.29 to 0.98)	64 fewer per 1,000 (from 3 fewer to 97 fewer)	⊕⊕○○ LOW ^{a,b}	CRITICAL
Overt hepatic encephalopathy												
5	1 RCT, 4 NRSI	serious ^a	serious ^c	not serious	not serious	none	331	1,729	RR 0.62 (0.41 to 0.93)	131 fewer per 1,000 (from 24 fewer to 203 fewer)	⊕⊕○○ LOW ^{a,c}	CRITICAL
Achievement of target portal pressure gradient (< 12 mmHg)												
3	1 RCT, 2 NRSI	serious ^a	not serious	not serious	serious ^d	none	203	191	RR 0.93 (0.83 to 1.03)	55 fewer per 1,000 (from 134 fewer to 24 more)	⊕⊕○○ LOW ^{a,d}	IMPORTANT
Post procedural portal pressure gradient (mmHg)												
4	1 RCT, 3 NRSI	serious ^a	very serious ^e	not serious	serious ^d	none	236	224	—	MD 0.82 mmHg higher (1.18 lower to 2.81 higher)	⊕○○○ VERY LOW ^{a,d,e}	IMPORTANT
Overall survival at 2 years												
5	1 RCT, 4 NRSI	serious ^a	serious ^f	not serious	not serious	none	331	1,729	RR 1.04 (0.96 to 1.13)	30 more per 1,000 (from 30 fewer to 97 more)	⊕⊕○○ LOW ^{a,f}	CRITICAL
Shunt dysfunction												
5	1 RCT, 4 NRSI	serious ^a	not serious	not serious	serious ^d	none	331	1,729	RR 0.97 (0.71 to 1.32)	5 fewer per 1,000 (from 52 fewer to 57 more)	⊕⊕○○ LOW ^{a,d}	IMPORTANT
Variceal rebleeding at 2 years												
5	1 RCT, 4 NRSI	serious ^a	not serious	not serious	serious ^d	none	331	1,729	RR 1.28 (0.96 to 1.70)	51 more per 1,000	⊕⊕○○ LOW ^{a,d}	IMPORTANT

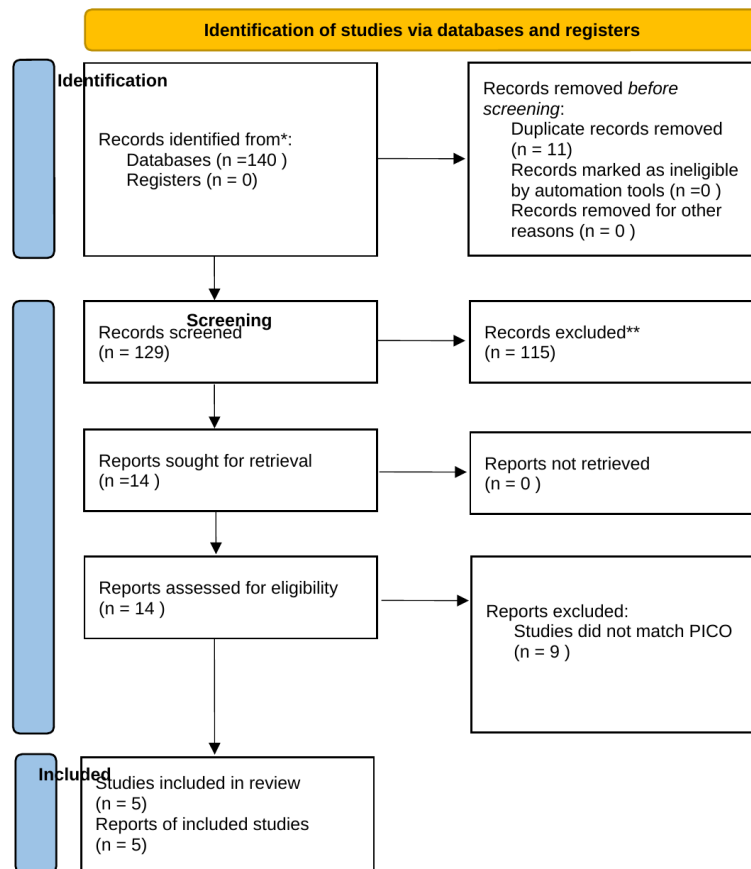
				s					1.69)	(from 7 fewer to 127 more)		
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Explanations:

- a. Downgraded one level for risk of bias. Three of four contributing non-randomized cohort studies (Liu 2021, Yan 2023, and Xia 2024) were rated serious risk of bias by ROBINS-I, primarily reflecting bias due to confounding and selection of participants. The single RCT (Zhang 2026) was rated some concerns by RoB 2 due to deviations from intended interventions arising from unavoidable lack of blinding.
- b. Downgraded one level for imprecision. The 95% confidence interval is wide and the upper bound approaches the line of no effect (0.98).
- c. Downgraded one level for inconsistency. Moderate statistical heterogeneity ($I^2 = 54\%$) driven by Yao 2022, the only directional outlier; sensitivity analysis excluding Yao 2022 strengthened the effect estimate.
- d. Downgraded one level for imprecision. The 95% confidence interval crosses the line of no effect.
- e. Downgraded two levels for inconsistency. Substantial statistical heterogeneity ($I^2 = 85\%$) driven by Zhang 2026, which reported a markedly larger mean difference than the other contributing trials; sensitivity analysis excluding Zhang 2026 resolved heterogeneity ($I^2 = 0\%$) and confirmed hemodynamic equivalence.
- f. Downgraded one level for inconsistency. Moderate statistical heterogeneity ($I^2 = 47\%$) driven by Xia 2024, the registry sized cohort with imbalanced sample sizes; sensitivity analysis excluding Xia 2024 reduced heterogeneity to $I^2 = 6\%$ and confirmed survival equivalence.

Supplementary Figures

PRISMA 2020 flow diagram for new systematic reviews which included searches of databases and registers only



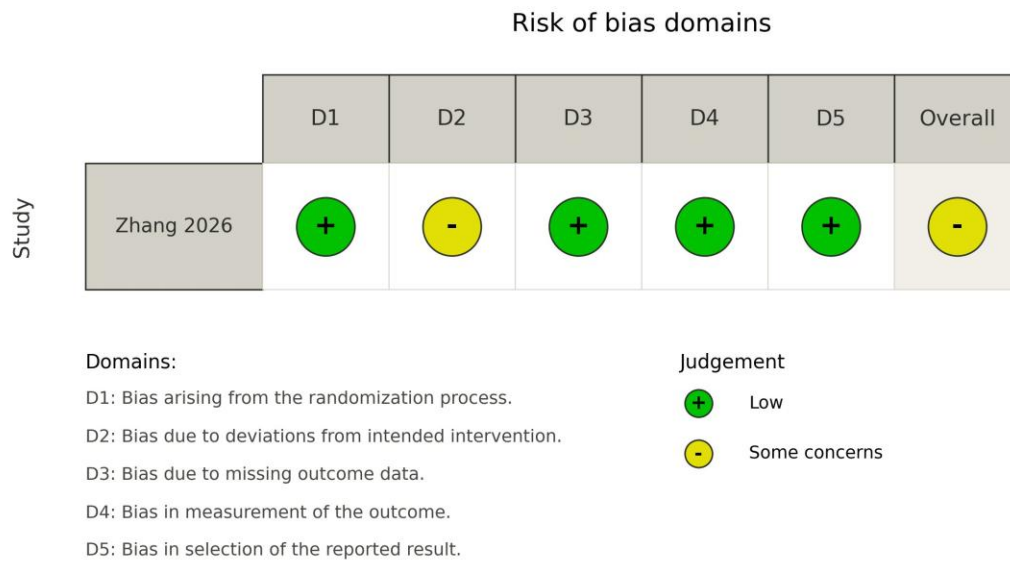
*Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers).

**If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

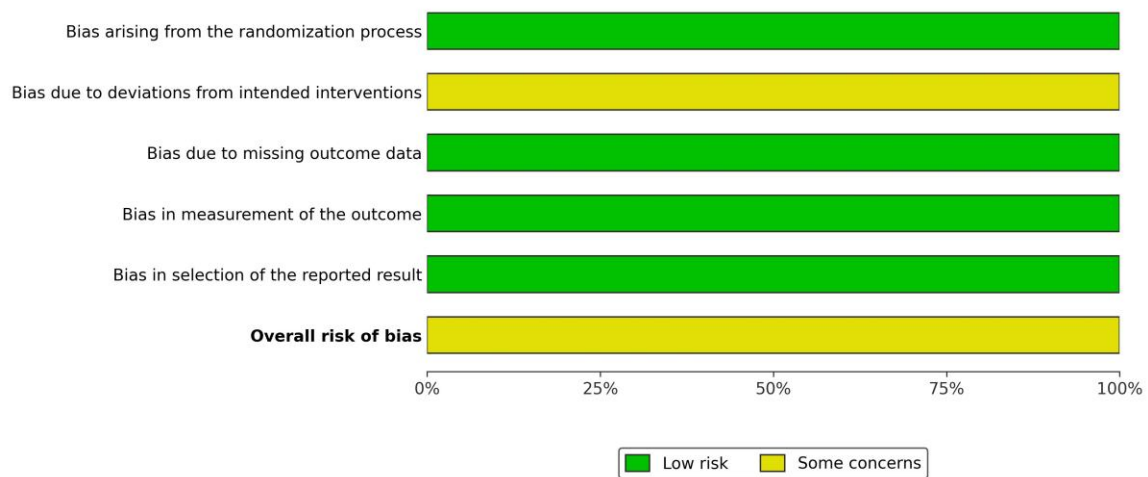
Source: Page MJ, et al. BMJ 2021;372:n71. doi: 10.1136/bmj.n71.

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Supplementary Figure 1. PRISMA 2020 flow diagram of study selection.



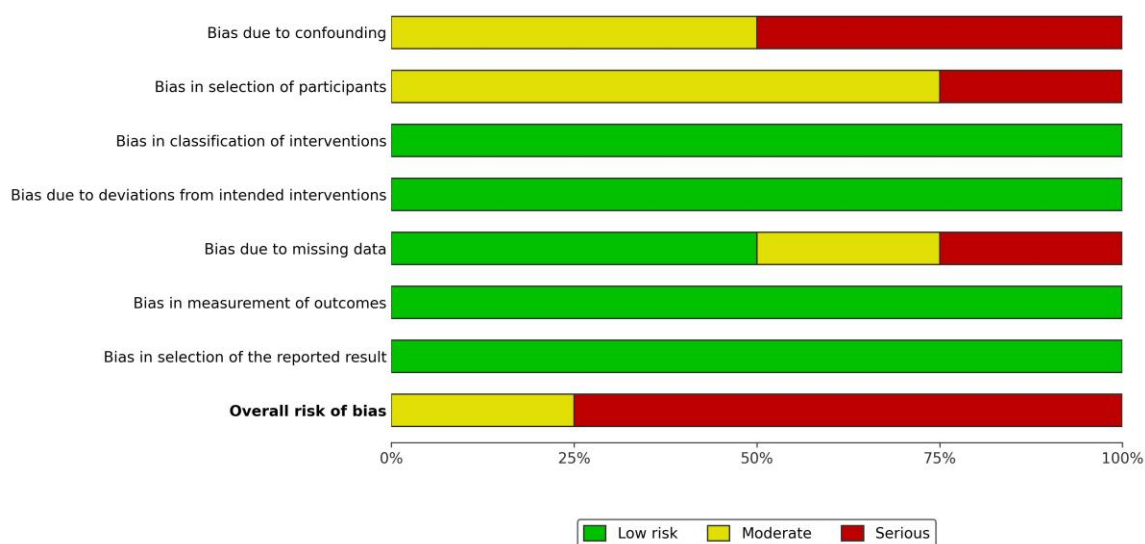
Supplementary Figure 2. Per study RoB 2 judgements across the five domains for Zhang 2026.



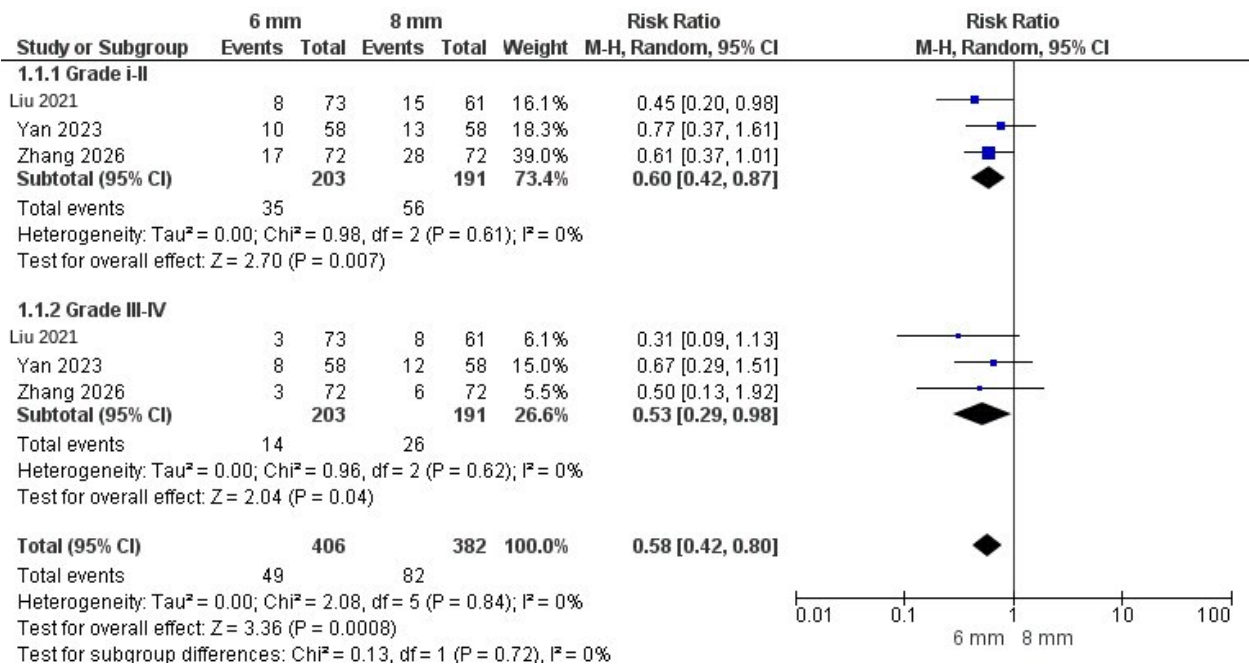
Supplementary Figure 3. Summary of RoB 2 judgements by domain for Zhang 2026.



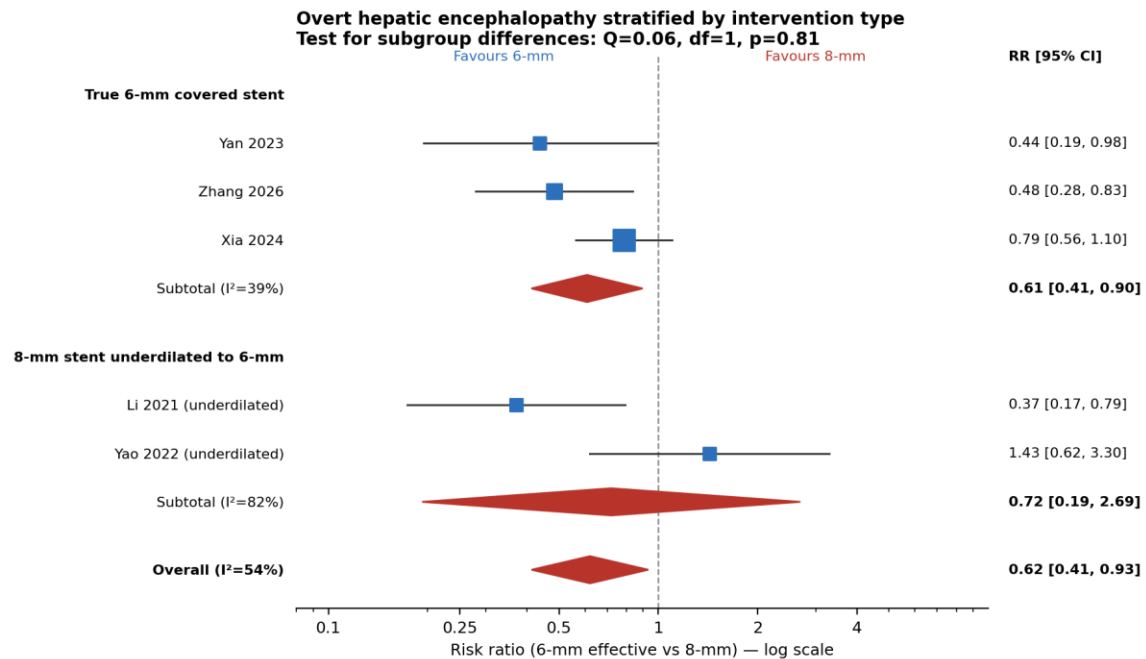
Supplementary Figure 4 Per study ROBINS-I judgements across the seven domains for the four cohort studies.



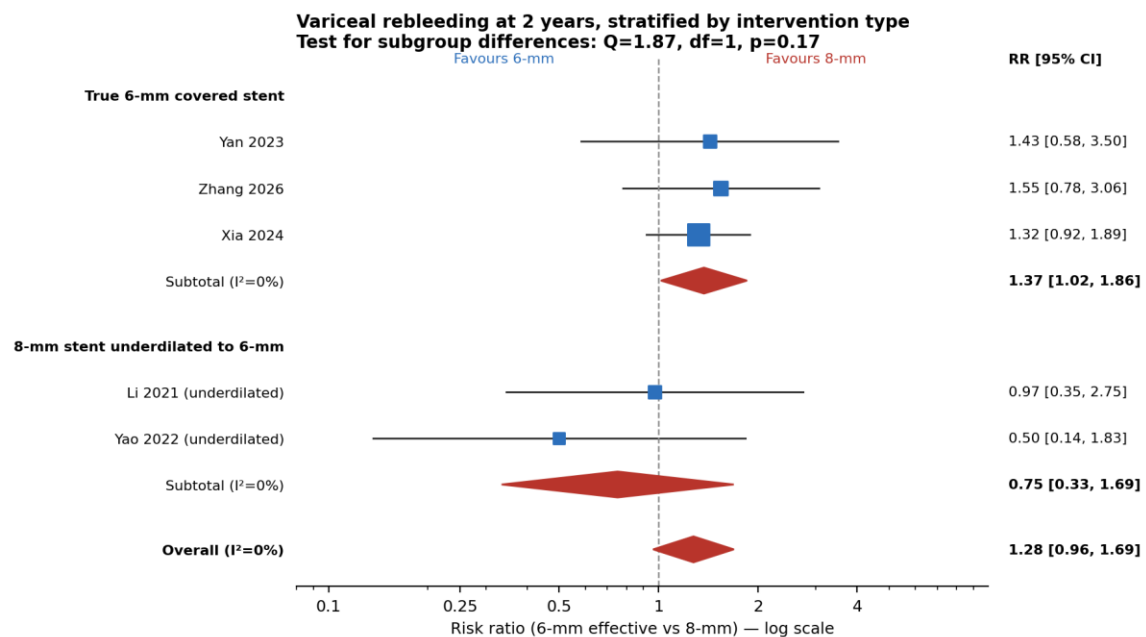
Supplementary Figure 5 Summary of ROBINS-I judgements by domain across the four cohort studies, expressed as the percentage of studies rated low, moderate, and serious risk.



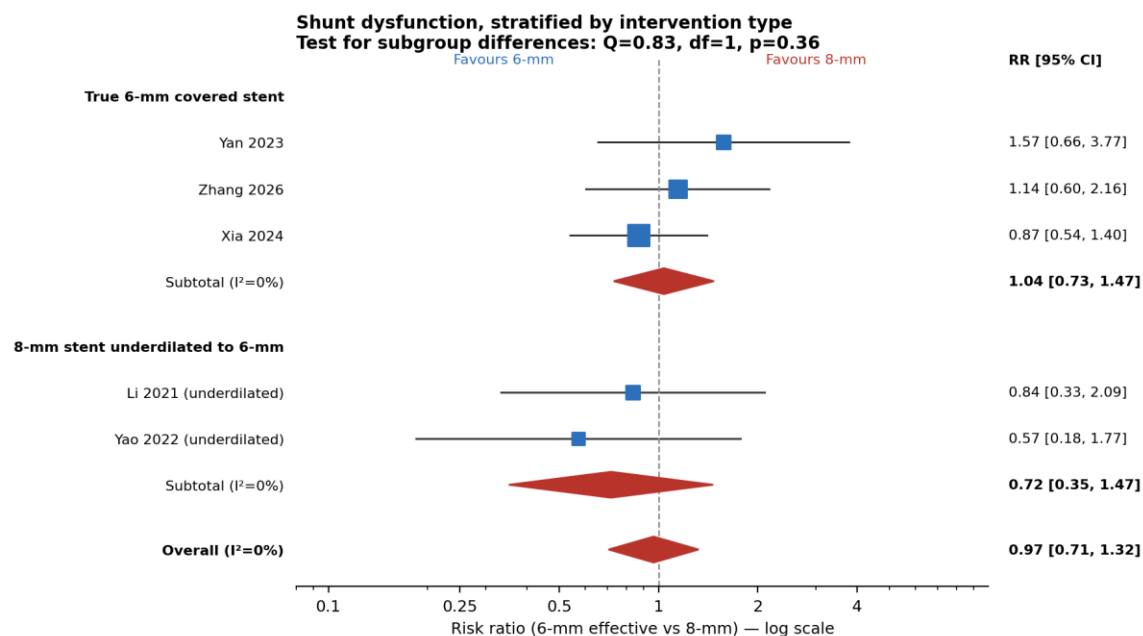
Supplementary Figure 6. Forest plot of risk ratio for hepatic encephalopathy stratified by severity grade.



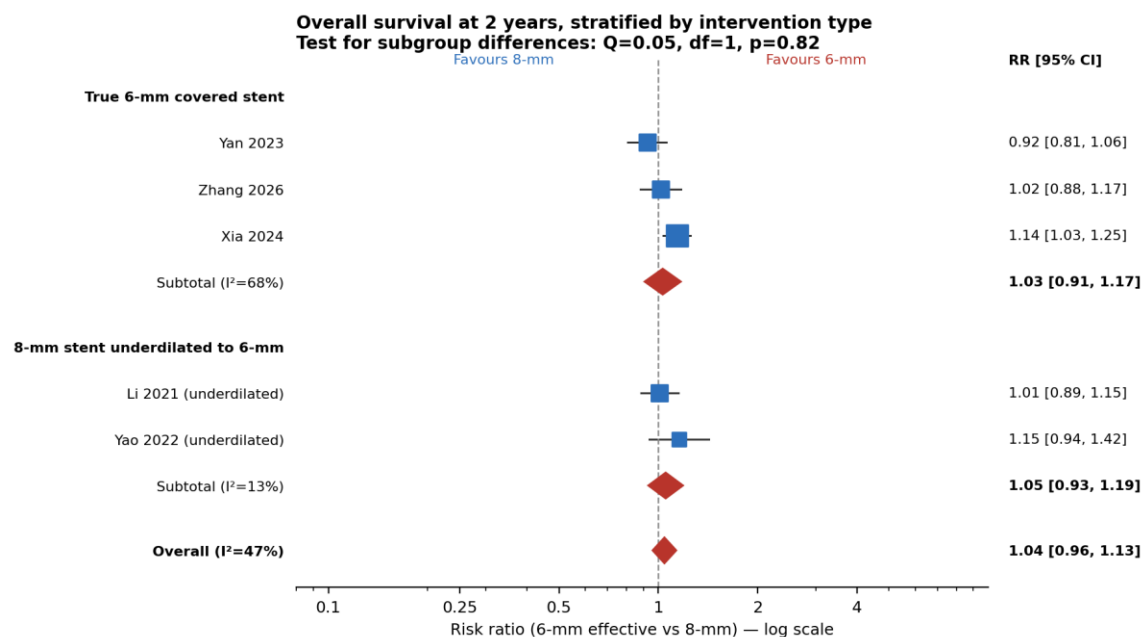
Supplementary Figure 7. Overt hepatic encephalopathy stratified by intervention type (true 6-mm vs underdilated 8-mm). Test for subgroup differences $P = 0.81$.



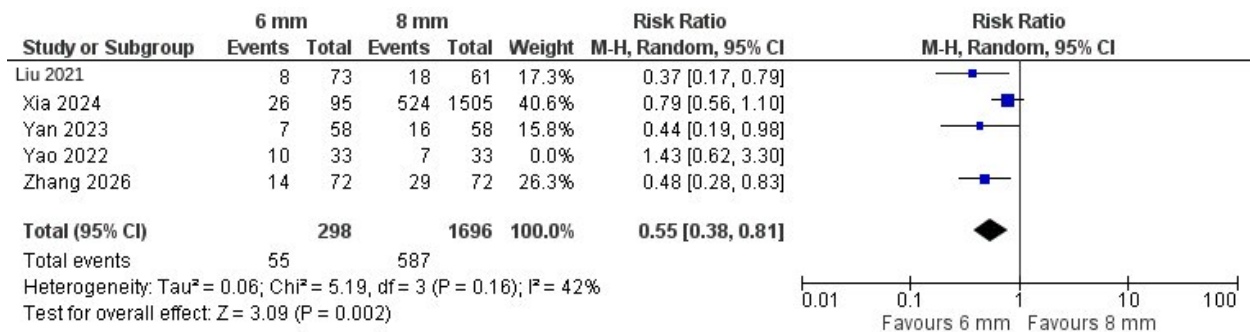
Supplementary Figure S9. Variceal rebleeding at 2 years stratified by intervention type. Test for subgroup differences $P = 0.17$.



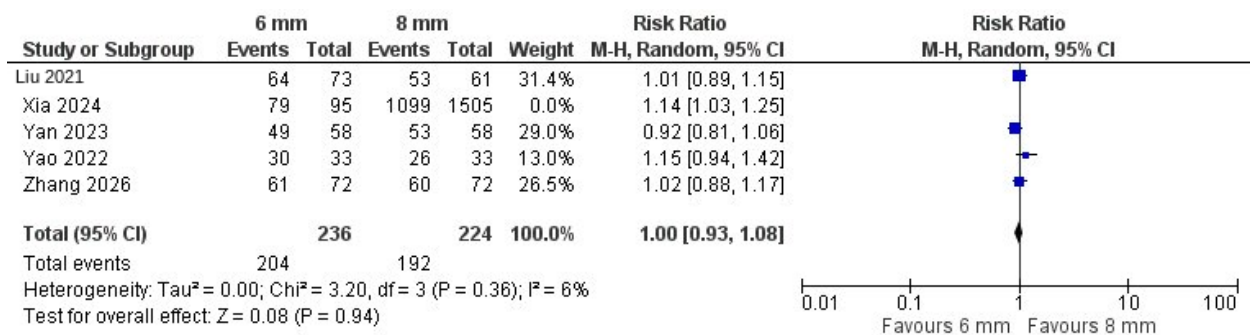
Supplementary Figure 8. Shunt dysfunction stratified by intervention type. Test for subgroup differences $P = 0.36$.



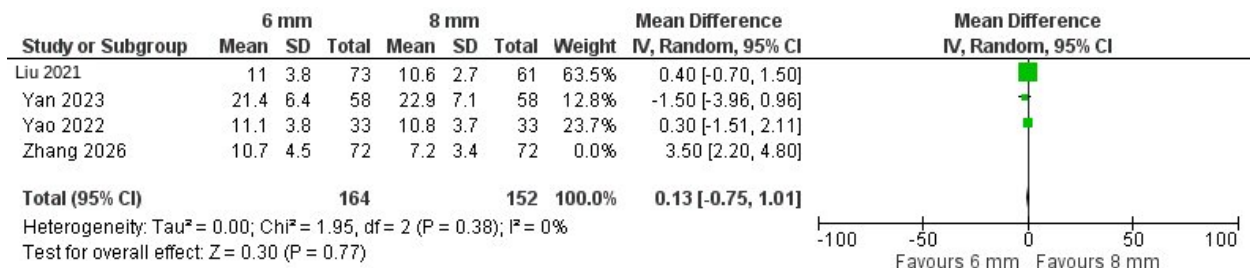
Supplementary Figure 9. Overall survival at 2 years stratified by intervention type. Test for subgroup differences $P = 0.82$.



Supplementary Figure 10. Sensitivity analysis forest plot for overt hepatic encephalopathy, excluding Yao 2022.



Supplementary Figure 11. Sensitivity analysis forest plot for overall survival at 2 years, excluding Xia 2024.



Supplementary Figure 12. Sensitivity analysis forest plot for continuous post-procedural portal pressure gradient, excluding Zhang 2026.