Appendix

Figure Legend

Supplementary Figure 1: Funnel Plot analysis for success rate at the first attempts (A), time to access (B) and number of attempts (C) in patients undergoing femoral cannulation with or without ultrasound guidance

Supplementary Figure 2. Risk estimates for vascular complications (A), hematoma (B) and (C) major bleeding in patients undergoing femoral cannulation with or without ultrasound guidance

Supplementary Figure 3. Funnel Plot analysis for pseudoaneurysm (A)**,** retroperitoneal hematoma (B) and venepuncture (C) in patients undergoing femoral cannulation with or without ultrasound guidance.

Supplementary Table 1: PRISMA Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	3
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., wWeb address), and, if available, provide registration information including registration number.	5
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	5
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	5
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	5
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	5
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	5
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	5
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	5

Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	5
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	5
Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	5
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	5
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	6
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	6
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	6
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	6
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	6
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	6
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	6
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	7
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	7
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	8
FUNDING			

Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	NA

Supplementary Table 2 Risk of bias assessment by seven~~7~~ Domains of the Cochrane Risk of Bias Tool

	Dudeck et al. 2004	Seto et al. 2010	Gedikoglu et al. 2013	Slattery et al. 2014	Marquis-Gavel et al. 2018	Katırcıbaşı et al. 2018	Nguyen et al. 2019
Random sequence generation	Low	High	High	Low	High	High	Low
Allocation concealment	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Low
Blinding of participants and personnel	Not blinded	Not blinded	Not Blinded	Not blinded	Not blinded	Not blinded	Not blinded
Blinding of outcome assessment	Not blinded	Not blinded	Not blinded	Not blinded	Not Blinded	Not blinded	Low
Incomplete outcome data	Low	Low	Low	Low	Low	Low	Low
Selective reporting	High	Low	Low	High	Low	Low	Low

Data reported as percentage (n/N) or mean±standard deviation when appropriate. ACS: acute coronary syndrome

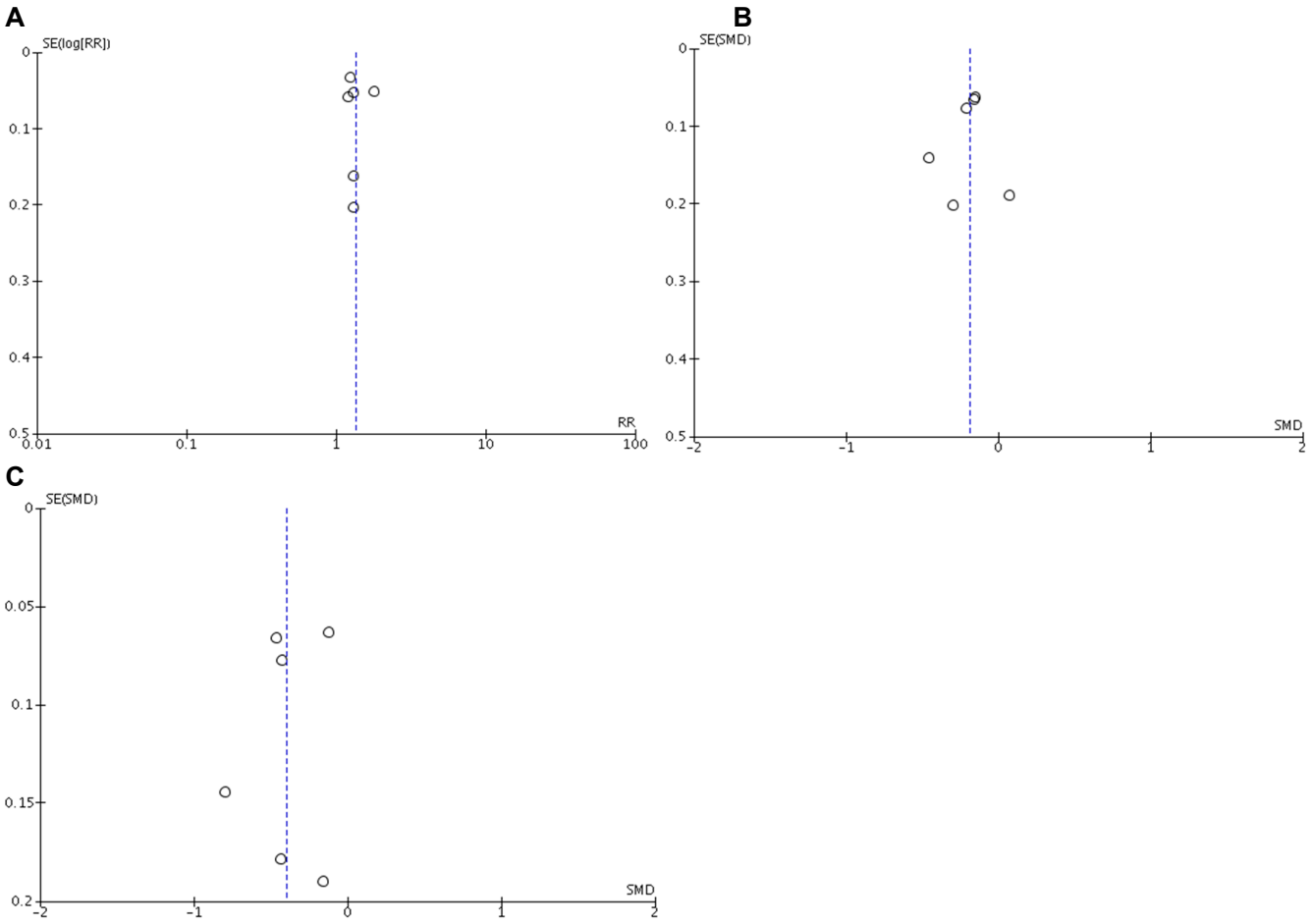
Supplemental Table 3: Trial influential analysis for the primary efficacy endpoint (success rate at the first attempt)

Study omitted	Risk Ratio	95% Confidence Interval	
Dudeck et al. 2004	1.36	1.16	1.60
Seto et al. 2010	1.26	1.20	1.32
Gedikoglu et al. 2013	1.39	1.17	1.67
Slattery et al. 2015	1.36	1.56	1.60
Katırcıbaşı et al. 2018	1.38	1.14	1.68
Nguyen et al. 2019	1.36	1.12	1.66
Combined	1.36	1.17	1.57

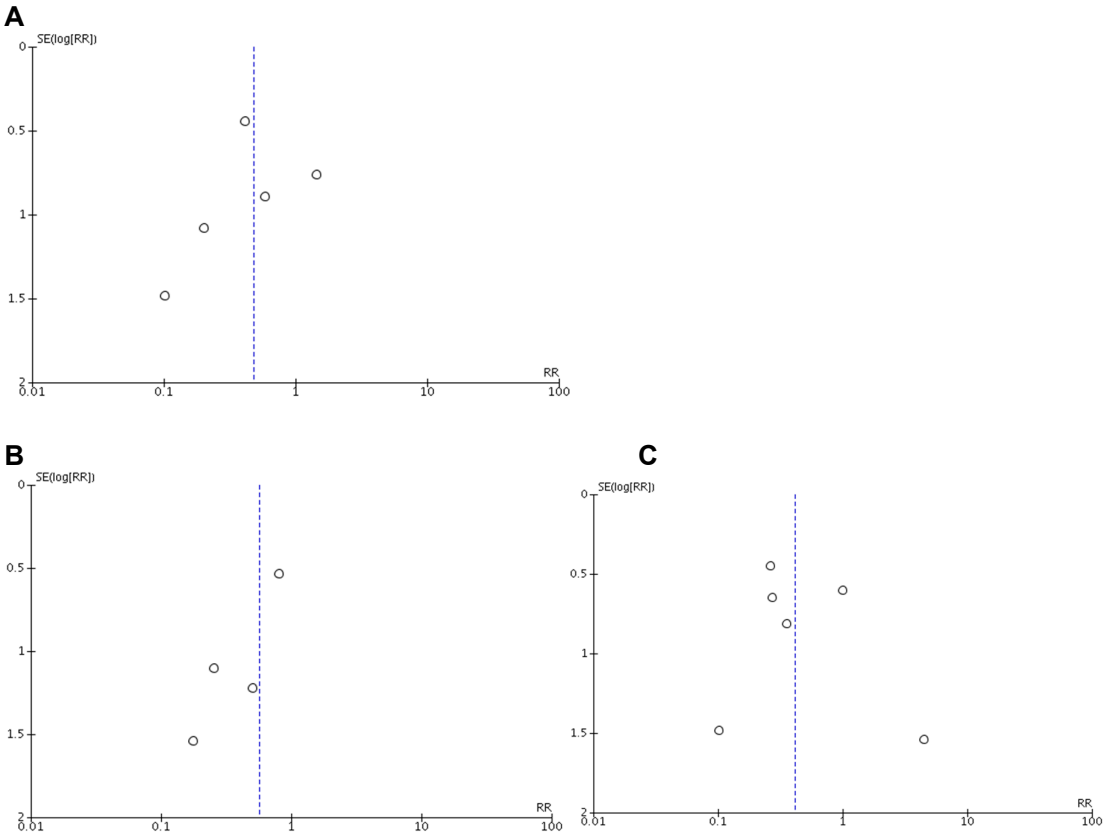
Supplemental Table 4: Trial influential analysis for the primary safety endpoint (vascular complications)

Study omitted	Risk Ratio	95% Confidence Interval	
Dudeck et al. 2004	0.30	0.16	0.56
Seto et al. 2010	0.47	0.19	1.14
Gedikoglu et al. 2013	0.45	0.21	0.94
Slattery et al. 2015	0.36	0.20	0.66
Katırcıbaşı et al. 2018	0.50	0.21	1.23
Nguyen et al. 2019	0.43	0.18	1.03
Combined	0.41	0.20	0.83

Supplementary Figure 1. Funnel Plot analysis for success rate at the first attempt (A), time to access (B) and number of attempts (C) in patients undergoing femoral cannulation with or without ultrasound guidance



Supplementary Figure 2. Risk estimates for vascular complications (A), major bleeding (B) and hematoma (B) in patients undergoing femoral cannulation with or without ultrasound guidance



Supplementary Figure 3. Funnel Plot analysis for pseudoaneurysm (A), retroperitoneal hematoma (B) and venepuncture (C) in patients undergoing femoral cannulation with or without ultrasound guidance.