

Supplemental Materials

Supplemental Methods

Search Strategy

Four databases (Medline, Embase, Web of Science and the Cochrane Library) were searched up to November 2020 using the following terms: (Transcatheter aortic valve implantation (TAVI) OR Transcatheter Aortic Valve Replacement (TAVR) OR Percutaneous aortic valve replacement/ implantation) AND (femoral artery OR transfemoral) AND (Ultrasonography OR echography OR fluoroscopy OR angiography). The detailed search strategy used is also shown on PROSPERO (CRD42020218259). The resultant titles and abstracts of the search were screened by three reviewers (JJHB, SR and RAK) for relevance. Then full texts were assessed for eligibility (Figure 1).

Detailed search strategy

Medline		
1	exp transcatheter aortic valve implantation/	6107
2	Transcatheter aortic valve implantation.ti,ab.	5211
3	TAVI.ti,ab.	4225
4	exp Transcatheter Aortic Valve Replacement/	6107
5	Transcatheter aortic valve replacement.ti,ab.	4439
6	TAVR.ti,ab.	3363
7	Percutaneous aortic valve replacement.ti,ab.	189
8	percutaneous aortic valve implantation.ti,ab.	118
9	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8	11826
10	exp Femoral Artery/	28820
11	femoral artery.ti,ab.	17734
12	transfemoral.ti,ab.	5460
13	10 or 11 or 12	42287

14	exp Ultrasonography/ or (ultrasound or ultrason* or echograph*).ti,ab.	635204
15	exp fluoroscopy/ or fluoroscop*.ti,ab.	39546
16	exp angiography/ or angiog*.ti,ab.	452324
17	14 or 15 or 16	1070170
18	9 and 13 and 17	513

Embase		
1	exp transcatheter aortic valve implantation/	22618
2	Transcatheter aortic valve implantation.ti,ab.	9897
3	TAVI.ti,ab.	10090
4	exp Transcatheter Aortic Valve Replacement/	22618
5	Transcatheter aortic valve replacement.ti,ab.	7953
6	TAVR.ti,ab.	7210
7	Percutaneous aortic valve replacement.ti,ab.	329
8	percutaneous aortic valve implantation.ti,ab.	218
9	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8	25520
10	exp Femoral Artery/	34463
11	femoral artery.ti,ab.	25720
12	transfemoral.ti,ab.	9367
13	10 or 11 or 12	50752
14	exp Ultrasonography/ or (ultrasound or ultrason* or echograph*).ti,ab.	1091052
15	exp fluoroscopy/ or fluoroscop*.ti,ab.	66362
16	exp angiography/ or angiog*.ti,ab.	638256
17	14 or 15 or 16	1673462
18	9 and 13 and 17	1720

Cochrane Library

ID	Search	Hits
#1	MeSH descriptor: [Transcatheter Aortic Valve Replacement] explode all trees	150
#2	"Transcatheter aortic valve implantation"	635
#3	TAVI	381
#4	("Transcatheter aortic valve replacement"):ti,ab,kw	490
#5	TAVR	433
#6	"Percutaneous aortic valve replacement"	1
#7	"percutaneous aortic valve implantation"	7
#8	(2-#7)	918
#9	MeSH descriptor: [Femoral Artery] explode all trees	991
#10	"femoral artery"	2214
#11	transfemoral	612
#12	(3-#11)	2680
#13	MeSH descriptor: [Ultrasonography] explode all trees	13623
#14	(ultrasound or ultrason* or echograph*)	44573
#15	MeSH descriptor: [Fluoroscopy] explode all trees	627
#16	fluoroscop*	3483
#17	MeSH descriptor: [Angiography] explode all trees	7178
#18	angiog*	23923
#19	{OR #13-#18}	73402
#20	(4, #12, #19)	50

Web of Science

# 9	193	#8 AND #5 AND #4 <i>Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years</i>
# 8	693,190	#7 OR #6

		<i>Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years</i>
# 7	<u>298,600</u>	((TS=(fluoroscop* OR angiog*))) AND DOCUMENT TYPES: (Article) <i>Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years</i>
# 6	<u>415,203</u>	((TS=(ultrasound OR ultrason* OR echograph*))) AND DOCUMENT TYPES: (Article) <i>Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years</i>
# 5	<u>17,479</u>	((TS=("Femoral Artery" OR "transfemoral"))) AND DOCUMENT TYPES: (Article) <i>Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years</i>
# 4	<u>6,771</u>	#3 OR #2 OR #1 <i>Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years</i>
# 3	<u>212</u>	((TS=("Percutaneous aortic valve replacement" OR "percutaneous aortic valve implantation"))) AND DOCUMENT TYPES: (Article) <i>Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years</i>
# 2	<u>3,155</u>	((TS=("Transcatheter Aortic Valve Replacement" OR "TAVR"))) AND DOCUMENT TYPES: (Article) <i>Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years</i>
# 1	<u>4,326</u>	((TS=("Transcatheter aortic valve implantation" OR "TAVI"))) AND DOCUMENT TYPES: (Article) <i>Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan=All years</i>

Data extraction

Study design and patient characteristics were derived and input in abbreviated summary into tables. Where not explicitly stated, range of sheath sizes were estimated from reported valve type and size. Outcomes were transferred in the form of crude dichotomous events. Studies that controlled for multiple confounders were extracted in the form of adjusted odds ratios (ORs) and standard errors calculated from 95% confidence intervals (95% CIs) or as event rates in propensity-matched studies. Where data on total complication rates was not provided, it was calculated by combining major and minor rates.

Supplemental Tables

Table I. Study participant characteristics

Study (first author, year)	Comparison arms	Average age (years)	Female sex (%)	PAD (%)	Diabetes (%)	Risk score	Antiplate lets (%)	Anticoag ulants (%)
Kotronias 2020 ¹⁷	Total	83 (79-86)	45.2	47.2	26.8	-	-	-
Potluri 2020 ¹⁹	Ultrasound	82 (53.8- 100.8)	50.0	24.5	42.6	STS: 5.6	-	-
	Fluoroscopy	84.1 (58.6-95.2)	40.9	27.2	36.2	STS: 6.4	-	-
Vincent 2020 ⁷	Ultrasound	82.1 (6.9)	62.1	34.7	32.6	STS: 5.4	31.6	30.5
	Fluoroscopy	81.7 (5.4)	56.8	31.6	29.5	STS: 5.3	32.6	25.3
Witberg 2020 ²¹	Ultrasound	82.3 (7.0)	54.3	13.0	25.5	Euro: 23.7	64.3	39.6
	Fluoroscopy	81.7 (8.6)	53.3	12.0	25.0	Euro: 22.3	64.4	38.0
Bouteau 2019 ^{14,15}	Ultrasound	83.8 (6.6)	46.4	5.6	32.9	STS:4.3 Euro 4.6	-	35.0
	Fluoroscopy	84.9 (5.7)	48.6	6.8	27.5	STS: 4.7 Euro: 6.4	-	32.9
Moriyama 2019 ¹⁸	Total	-	-	-	-	-	-	-
Khan 2019 ¹⁷	Total	-	-	-	-	-	-	-
Elbaz-Greener 2017 ⁶	Ultrasound	83	46.5	16.5	28.9	STS: 6.1	79.3	32.6
	Fluoroscopy	(79-87)				STS: 7.9		

Antiplatelet therapy refers to single or dual antiplatelet therapy. Euro: Logistic EuroSCORE II; STS: The Society of Thoracic Surgeons Score; PAD: peripheral arterial disease.

Table II. Risk of bias assessment of outcomes according to ROBINS-I (Risk Of Bias In Non-randomised Studies of Interventions)

First author, Year (Ref. #)	Bias due to confounding	Bias in selection of participants	Bias in classification of interventions	Bias due to departures from intended interventions	Bias due to missing data	Bias due to measurement of outcomes	Bias in selection of reported results	Overall risk of bias judgment
Major and minor access site vascular complications								
Kotronias, 2020 ¹⁷	Moderate	Low	Low	Low	Low	Moderate	Low	Moderate
Potluri, 2020 ¹⁹	Serious	Low	Low	Low	No information	Low	Low	Serious
Vincent, 2020 ⁷	Moderate	Low	Low	Low	Low	Moderate	Low	Moderate
Witberg, 2020 ²¹	Moderate	Low	Low	Low	No information	Moderate	Low	Moderate
Bouteau, 2019 ^{14,15}	Serious	Low	Low	Low	Low	Low	Low	Serious
Moriyama, 2019 ¹⁸	Moderate	Low	Low	Low	No information	No information	No information	Moderate
Elbaz-Greener, 2017 ⁶	Serious	Low	Low	Low	Low	Moderate	Low	Serious
Major access site vascular complications								
Kotronias, 2020 ¹⁷	Moderate	Low	Low	Low	Low	Moderate	Low	Moderate
Potluri, 2020 ¹⁹	Serious	Low	Low	Low	No information	Low	Low	Serious
Vincent, 2020 ⁷	Moderate	Low	Low	Low	Low	Moderate	Low	Moderate
Witberg, 2020 ²¹	Moderate	Low	Low	Low	No information	Moderate	Low	Moderate
Bouteau, 2019 ^{14,15}	Serious	Low	Low	Low	Low	Low	Low	Serious
Moriyama, 2019 ¹⁸	Moderate	Low	Low	Low	No information	No information	No information	Moderate

Khan, 2019 ¹⁶	Serious	No information	Low	Low	No information	No information	No information	Serious
Elbaz-Greener, 2017 ⁶	Serious	Low	Low	Low	Low	Moderate	Low	Serious
Minor access site vascular complications								
Kotronias, 2020 ¹⁷	Moderate	Low	Low	Low	Low	Moderate	Low	Moderate
Potluri, 2020 ¹⁹	Serious	Low	Low	Low	No information	Low	Low	Serious
Vincent, 2020 ⁷	Moderate	Low	Low	Low	Low	Moderate	Low	Moderate
Witberg, 2020 ²¹	Moderate	Low	Low	Low	No information	Moderate	Low	Moderate
Bouteau, 2019 ^{14,15}	Serious	Low	Low	Low	Low	Low	Low	Serious
Moriyama, 2019 ¹⁸	Moderate	Low	Low	Low	No information	No information	No information	Moderate
Elbaz-Greener, 2017 ⁶	Serious	Low	Low	Low	Low	Moderate	Low	Serious
Life-threatening, major and minor access site bleeding complications								
Kotronias, 2020 ¹⁷	Serious	Low	Low	Low	Low	Moderate	Low	Serious
Potluri, 2020 ^{*,20}	Serious	No information	Low	Low	No information	No information	No information	Serious
Vincent, 2020 ⁷	Moderate	Low	Low	Low	Low	Moderate	Low	Moderate
Witberg, 2020 ²¹	Moderate	Low	Low	Low	No information	Moderate	Low	Moderate
Elbaz-Greener, 2017 ⁶	Serious	Low	Low	Low	Low	Moderate	Low	Serious
Life-threatening and major access site bleeding complications								
Kotronias, 2020 ¹⁷	Serious	Low	Low	Low	Low	Moderate	Low	Serious
Potluri, 2020 ^{*,20}	Serious	No information	Low	Low	No information	No information	No information	Serious

Vincent, 2020 ⁷	Moderate	Low	Low	Low	Low	Moderate	Low	Moderate
Witberg, 2020 ²¹	Moderate	Low	Low	Low	No information	Moderate	Low	Moderate
Moriyama, 2019 ¹⁸	Moderate	Low	Low	Low	No information	No information	No information	Moderate
Elbaz-Greener, 2017 ⁶	Serious	Low	Low	Low	Low	Moderate	Low	Serious
Minor access site bleeding complications								
Kotronias, 2020 ¹⁷	Serious	Low	Low	Low	Low	Moderate	Low	Serious
Potluri, 2020 ^{*,20}	Serious	No information	Low	Low	No information	No information	No information	Serious
Vincent, 2020 ⁷	Moderate	Low	Low	Low	Low	Moderate	Low	Moderate
Witberg, 2020 ²¹	Moderate	Low	Low	Low	No information	Moderate	Low	Moderate
Elbaz-Greener, 2017 ⁶	Serious	Low	Low	Low	Low	Moderate	Low	Serious
Transfusion of red blood cells								
Vincent, 2020 ⁷	Moderate	Low	Low	Low	Low	Moderate	Low	Moderate
Witberg, 2020 ²¹	Moderate	Low	Low	Low	No information	Moderate	Low	Moderate
Elbaz-Greener, 2017 ⁶	Serious	Low	Low	Low	Low	Moderate	Low	Serious

*Since the study by Potluri and colleagues¹⁹ did not report sufficient data to ascertain access site-related bleeding complications, bleeding outcomes were taken from Basra and colleagues²⁰; a study from the same center and authors with an overlapping study time periods that provided sufficient data to adjudicate bleeding events as access site-related. Quality assessment was based on the information that was available in Basra and colleagues.

Table III. GRADE Assessment of overall strength of evidence

Certainty assessment							№ of patients		Effect		Certainty	Importance
№ of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Ultrasound	Fluoroscopy	Relative (95% CI)	Absolute (95% CI)		

Major and minor access site vascular complications

7	observational studies	very serious ^a	serious ^b	not serious ^c	not serious ^d	all plausible residual confounding would reduce the demonstrated effect	220/2002 (11.0%)	231/1560 (14.8%)	OR 0.54 (0.37 to 0.80)	62 fewer per 1,000 (from 88 fewer to 26 fewer)	⊕○○○ VERY LOW	CRITICAL
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Major access site vascular complications

8	observational studies	very serious ^a	not serious ^e	not serious ^c	not serious ^d	all plausible residual confounding would reduce the demonstrated effect	98/2218 (4.4%)	113/1646 (6.9%)	OR 0.51 (0.35 to 0.74)	32 fewer per 1,000 (from 44 fewer to 17 fewer)	⊕○○○ VERY LOW	CRITICAL
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Minor access site vascular complications

7	observational studies	very serious ^a	not serious ^e	not serious ^c	not serious ^d	all plausible residual confounding would reduce the demonstrated effect	122/2150 (5.7%)	122/1560 (7.8%)	OR 0.59 (0.38 to 0.91)	31 fewer per 1,000 (from 47 fewer to 7 fewer)	⊕○○○ VERY LOW	CRITICAL
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Life threatening, major and minor access site bleeding complications

Certainty assessment							N ^o of patients		Effect		Certainty	Importance
N ^o of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Ultrasound	Fluoroscopy	Relative (95% CI)	Absolute (95% CI)		
5	observational studies	very serious ^a	serious ^b	not serious ^c	not serious ^d	all plausible residual confounding would reduce the demonstrated effect	143/1404 (10.2%)	131/1086 (12.1%)	OR 0.59 (0.39 to 0.90)	46 fewer per 1,000 (from 70 fewer to 11 more)	⊕○○○ VERY LOW	CRITICAL

Life-threatening and major access site bleeding complications

6	observational studies	very serious ^a	serious ^b	not serious ^c	serious ^f	all plausible residual confounding would reduce the demonstrated effect	75/1539 (4.9%)	87/1221 (7.1%)	OR 0.52 (0.26 to 1.04)	33 fewer per 1,000 (from 52 fewer to 3 more)	⊕○○○ VERY LOW	CRITICAL
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Minor access site bleeding complications

5	observational studies	very serious ^a	serious ^b	not serious ^c	serious ^f	all plausible residual confounding would reduce the demonstrated effect	70/1404 (5.0%)	56/1086 (5.2%)	OR 0.67 (0.34 to 1.31)	16 fewer per 1,000 (from 33 fewer to 15 more)	⊕○○○ VERY LOW	CRITICAL
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Transfusion of red blood cells

Certainty assessment							N ^o of patients		Effect		Certainty	Importance
N ^o of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Ultrasound	Fluoroscopy	Relative (95% CI)	Absolute (95% CI)		
3	observational studies	very serious ^a	serious ^e	not serious ^d	serious ^f	all plausible residual confounding would reduce the demonstrated effect	78/902 (8.6%)	68/846 (8.0%)	OR 0.73 (0.19 to 2.74)	20 fewer per 1,000 (from 64 fewer to 113 more)	⊕○○○ VERY LOW	IMPORTANT

^a very serious risk of bias is due to the inclusion of studies of moderate to high risk of bias according to the Robins I tool. ^b: serious, moderate variation in point estimates with some overlap in CIs and substantial heterogeneity. ^c: unimportant as studies represent a selection of valve systems with varying prevalence of peripheral arterial disease. ^d: not serious as confidence intervals do not overlap with line of no effect with adequate total number of events. ^e: Unimportant, some variation in point estimates with large overlap in CIs and moderate heterogeneity. ^f: serious as confidence intervals overlap with line of no effect with generally small number of events. ^g: serious as confidence intervals overlap with line of no effect despite the adequate number of events. *CI: Confidence interval; OR: Odds ratio.*

Table IV. Outcomes according to imaging modality

Study	Criteria	Outcomes	Ultrasound (events/total)	Fluoroscopy (events/total)	Adjusted odds ratio (95% confidence interval)
Kotronias 2020 ¹⁷	VARC-2	Major and minor access site VCs	22/393 (5.6%)	21/125 (16.8%)	0.33 (0.11-0.94)
		Major access site VCs	12/393 (3.05%)	7/125 (5.6%)	0.53 (0.20-1.38)
		Minor access site VCs	10/393 (2.54%)	14/125 (11.2%)	0.31 (0.11-0.85)
		Life-threatening, major and minor access site BCs	17/393 (4.33%)	12/125 (9.6%)	-
		Life-threatening and major access site BCs	10/393 (2.54%)	3/125 (2.4%)	-
		Minor access site BCs	7/393 (1.78%)	9/125 (7.2%)	-
Potluri 2020 ^{19,20}	VARC-2	Major and minor access site VCs	27/380 (7.9%)	29/232 (14.2%)	-
		Major access site VCs	12/380 (3.2%)	13/232 (5.6%)	-
		Minor access site VCs	15/380 (3.9%)	16/232 (6.9%)	-
		Life-threatening, major and minor access site BCs* [†]	5/109 (4.59%)	9/115 (7.83%)	-
		Major and life-threatening access site BCs [†]	5/109 (4.59%)	7/115 (6.09%)	-
		Minor access site BCs [†]	0/109 (0%)	2/115 (1.74%)	-
Vincent 2020 ⁷	VARC-2	Major and minor access site VCs	13/95 (13.7%)	28/95 (29.5%)	0.37 (0.17-0.77)
		Major access site VCs	4/95 (4.2%)	12/95 (12.6%)	0.31 (0.12-0.85)
		Minor access site VCs	9/95 (9.5%)	16/95 (16.8%)	0.61 (0.24-1.52)
		Life-threatening, major and minor access site BCs	13/95 (13.7%)	26/95 (27.4%)	0.42 (0.20-0.88)
		Life-threatening and major access site BCs	4/95 (4.2%)	12/95 (12.6%)	0.30 (0.09-0.96)
		Minor access site BCs	9/95 (9.5%)	14/95 (14.7%)	0.61 (0.25-1.48)
		Transfusion of RBCs	11/95 (11.6%)	20/95 (21.1%)	0.48 (0.21-1.09)
Witberg 2020 ²¹	VARC-2	Major and minor access site VCs	36/529 (6.8%)	43/642 (6.7%)	1.12 (0.65-1.96)
		Major access site VCs	16/529 (3.0%)	16/642 (2.6%)	1.14 (0.51-2.78)
		Minor access site VCs	20/529 (3.8%)	27/642 (4.0%)	0.89 (0.39-2.04)
		Life-threatening, major and minor access site BCs	34/529 (6.4%)	38/642 (5.9%)	1.06 (0.61-1.92)
		Life-threatening and major access site BCs*	19/529 (3.6%)	18/642 (2.8%)	-
		Life-threatening access site BCs	8/529 (1.5%)	11/642 (1.7%)	0.83 (0.59-3.13)
		Major access site BCs	11/529 (2.1%)	7/642 (1.1%)	1.35 (0.40-3.23)
		Minor access site BCs	15/529 (2.8%)	20/642 (3.1%)	0.80 (0.58-3.45)
		Transfusion of RBCs	44/529 (8.3%)	24/642 (3.7%)	2.85 (1.32-5.88)

Bouteau 2019 ^{14,15}	-	Major and minor access site VCs*	61/340 (17.9%)	51/222 (23.0%)	-
		Major access site VCs	19/340 (5.6%)	23/222 (10.4%)	-
		Minor access site VCs	42/340 (12.4%)	28/222 (12.6%)	-
Moriyama 2019 ¹⁸	-	Major and minor access site VCs*	5/135 (3.7%)	21/135 (15.6)	0.21 (0.08-0.57)
		Major access site VCs	2/135 (1.5%)	10/135 (7.4%)	0.19 (0.04-0.87)
		Minor access site VCs	3/135 (2.2%)	11/135 (8.2%)	0.26 (0.07-0.94)
		Life-threatening and major access site BCs	2/135 (1.5%)	12/135 (8.9%)	0.15 (0.03-0.70)
Khan 2019 ¹⁶	VARC-2	Major access site VCs	0/68 (0%)	4/86 (4.65%)	-
Elbaz-Greener 2017 ⁶	VARC-2	Major and minor access site VCs*	56/278 (20.2%)	38/109 (34.9%)	-
		Major access site VCs	33/278 (11.9%)	28/109 (25.7%)	-
		Minor access site VCs	23/278 (8.3%)	10/109 (9.2%)	-
		Life-threatening, major and minor access site BCs*	74/278 (26.6%)	46/109 (42.2%)	-
		Major and life-threatening access site BCs	35/278 (12.6%)	35/109 (32.1%)	-
		Major access site BCs	30/278 (10.8%)	28/109 (25.7%)	-
		Minor access site BCs	39/278 (14.0%)	11/109 (10.1%)	-
		Transfusion of RBCs	23/278 (8.3%)	24/109 (22.0%)	-

*: calculated from already known data assuming life-threatening, major and minor categories are assumed as separate entities, as per VARC criteria. †: Since the study by Potluri and colleagues¹⁹ did not report sufficient data to ascertain access site related bleeding complications, bleeding outcomes were taken from Basra and colleagues²⁰; a study from the same center and authors with a overlapping study time periods that provided sufficient data to adjudicate bleeding events as access site related; *BCs: Bleeding complications; RBCs: red blood cells; VARC-2: Valve Academic Research Consortium-2; VCs: vascular complications.*

Table V. Sensitivity Analyses

Sensitivity analysis domain	Aspect interrogated		Outcomes OR (95% CI)
Data analysed	Maximally adjusted outcomes	Total access site vascular complications	0.44 (0.20-0.99)
		Major access site vascular complications	0.49 (0.24-1.02)
		Minor access site vascular complications	0.51 (0.29-0.90)
		Total access site bleeding complications	0.69 (0.28-1.70)
		Life-threatening and major access site bleeding complications	0.23 (0.09-0.60)
		Minor access site bleeding complications	0.70 (0.37-1.31)
		Transfusion of red blood cells	0.66 (0.13-3.27)
	'Moderate' Risk of Bias only	Total access site vascular complications	0.42 (0.20-0.89)
		Major access site vascular complications	0.51 (0.23-1.16)
		Minor access site vascular complications	0.43 (0.20-0.90)
		Total access site bleeding complications	0.71 (0.28-1.80)
		Life-threatening and major access site bleeding complications	0.44 (0.12-1.71)
		Minor access site bleeding complications	0.78 (0.46-1.34)
		Transfusion of red blood cells	1.47 (0.97-2.22)
Analysis methods	Inverse variance		No change
	Fixed effect meta-analysis	Total access site vascular complications	0.56 (0.46-0.69)
		Major access site vascular complications	0.51 (0.38-0.68)
		Minor access site vascular complications	0.66 (0.51-0.86)
		Total access site bleeding complications	0.63 (0.48-0.82)
		Life-threatening and major access site bleeding complications	0.52 (0.37-0.72)
		Minor access site bleeding complications	0.79 (0.54-1.15)
		Transfusion of red blood cells	0.94 (0.67-1.32)
Heterogeneity	Sequential removal algorithm to	Total access site vascular complications	0.45 (0.32-0.63) I ² : 47%
		Minor access site vascular complications	0.75 (0.55-1.02) I ² : 12%

	reach $I^2 < 50\%$	Total access site bleeding complications	0.47 (0.34-0.66) I^2 : 0%
		Life-threatening and major access site bleeding complications	0.39 (0.22-0.68) I^2 : 30%
		Minor access site bleeding complications	0.94 (0.59-1.49) I^2 : 10%

Moderate Risk of Bias shows outcomes following the removal of studies at 'Serious' Risk of Bias. 'Total': major and minor vascular complications/ life-threatening, major and minor bleeding complications. *CI*: confidence interval; *I²*: heterogeneity; *OR*: odds ratio

Table VI. Table indicating methods of adjustment and covariates of adjustment.

Study	Outcome	Method	Adjustment covariates
Kotronias 2020 ¹⁸	Vascular complications	Multivariate logistic regression	Year of operation, LV-guidewire pacing, peripheral arterial disease
Vincent 2020 ⁷	Vascular and bleeding complications	Propensity matching	Age, gender, BMI, NYHA class III or IV, STS-PROM Score, Anticoagulant, Diabetes, Hypertension, Coronary artery disease, prior cerebrovascular disease, chronic obstructive airways disease, peripheral arterial disease; prior atrial fibrillation, renal function, LVEF, aortic valve area, mean aortic gradient, primary access sheath size, secondary access sheath size, prosthesis size, sheath to femoral artery ratio
Witberg 2020 ²¹	Vascular and bleeding complications	Multivariate logistic regression	Age, sex, diabetes mellitus, glomerular filtration rate, previous stroke or transient ischaemic attack, peripheral vascular disease, body mass index, frailty, and general anaesthesia
Moriyama 2019 ¹⁸	Vascular complications	Propensity matching	No information available

BMI: Body mass index; LV: left ventricle; LVEF: left ventricle ejection fraction; NYHA: New York Heart Association; STS-PROM: Society of Thoracic Surgeons 30-Day Predicted Risk of Mortality.

Supplemental Figure

Figure I

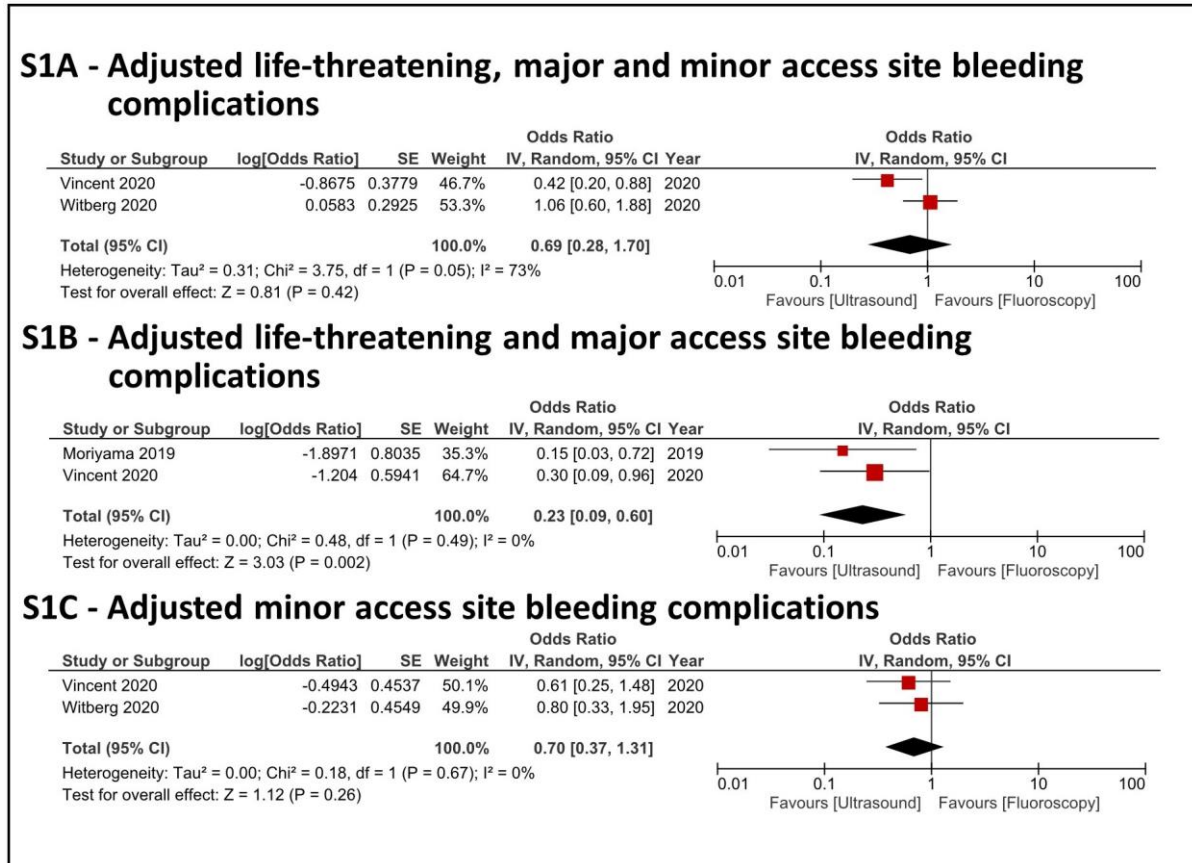


Figure I: Meta-analyses evaluating maximally adjusted risk of life-threatening, major and minor access site bleeding complications (**S1A**), life-threatening and major access site bleeding complications (**S1B**) and minor access site bleeding complications (**S1C**) of an ultrasound-guided versus fluoroscopy-guided TAVR access strategy.