

## **SUPPLEMENTARY MATERIAL**

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## Supplemental Appendix S1. Embase search strategy.

1. exp atrial fibrillation/
2. postop\*.mp.
3. atrial fibrillation.mp.
4. periop\*.mp.
5. arrhythmia.mp.
6. tachyarrhythmia.mp.
7. supraventricular arrhythmias.mp.
8. new onset postoperative atrial fibrillation.mp.
9. perioperative arrhythmia.mp.
10. poaf.mp.
11. post-operative atrial fibrillation.mp.
12. peri-operative atrial fibrillation.mp.
13. AF.mp.
14. 2 and 3
15. 3 and 4
16. 2 and 13
17. 2 and 5
18. 4 and 5
19. 2 and 6
20. 4 and 6
21. 1 or 3 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20
22. exp surgery/
23. cardiac surgery procedure.mp.
24. coronary surgery.mp.
25. cabg.mp.
26. coronary artery bypass surgery.mp.
27. non cardiac surgery.mp.

28. non-cardiac surgery.mp.
29. surgery.mp.
30. 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29
31. exp cerebrovascular accident/
32. ischemic stroke.mp.
33. cardioembolic infarct.mp.
34. cardioembolic stroke.mp.
35. brain ischemia.mp.
36. ischemic cerebrovascular event.mp.
37. cerebrovascular insult.mp.
38. brain attack.mp.
39. brain embolism.mp.
40. intracranial embolism.mp.
41. ischemic cerebral attack.mp.
42. acute cerebrovascular lesion.mp.
43. acute focal cerebral vasculopathy.mp.
44. brain accident.mp.
45. brain insult.mp.
46. brain ischemic attack.mp.
47. cerebral apoplexy.mp.
48. cerebral insult.mp.
49. cerebral stroke.mp.
50. cerebral vascular accident.mp.
51. cerebrovascular arrest.mp.
52. cerebrovascular failure.mp.
53. cerebrovascular injury.mp.
54. cerebral vascular accident.mp.
55. exp brain ischemia/

56. exp embolism/

57. exp thrombosis/

58. embolism.mp.

59. thromboembolism.mp.

60. systemic embolism.mp.

61. thrombo embolism.mp.

62. thromboembolic.mp.

63. (embolism and thrombosis).mp.

64. exp transient ischemic attack/

65. mini stroke.mp.

66. transient cerebral ischemia.mp.

67. transient brain ischemia.mp.

68. transient brain ischaemia.mp.

69. 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or

50 or 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65 or 66 or 67 or 68

70. 21 and 30 and 69

**Supplemental Table S1. Quality assessment for included studies.**

Study		Selection				Comparability	Outcome			Total
First Author	Publication Year	Representativeness of exposed cohort	Selection of non exposed cohort	Ascertainment of exposure	Outcome not present at start of study	Comparability based on design/analysis	Assessment of outcome	Length of follow-up	Adequacy of follow-up	
Ahlsson	2010	*	*	*	*	-	-	*	*	6
Al-Khatib	2009	*	*	-	-	-	*	*	*	5
Almassi	1997	*	*	*	-	-	*	*	-	5
Almassi	2019	*	*	-	-	- / **	*	* / *	*	5/7
Attaran	2011	*	*	*	-	**	*	-	-	6
Auer	2005	*	*	*	-	-	*	-	*	5
Barbieri	2013	*	*	-	-	-	-	-	-	2
Batra	2019	*	*	*	-	**	*	*	*	8
Bendetto	2020	*	*	*	*	- / **	*	* / *	-	6/8
Biancari	2013	*	*	-	*	** / **	*	* / *	-	7/7
Bramer	2010	*	*	*	-	-	*	*	-	5
Bramer	2011	*	*	*	-	-	*	-	-	4
Butt	2019	*	*	*	-	**	*	*	-	7

Butt	2018	*	*	*	-	**	*	*	-	7
Choi	2009	*	*	*	-	-	-	-	-	3
Coletta	2019	*	*	*	*	-	*	*	-	6
Conen	2020	*	*	*	*	- / **	*	- / *	-	5/8
Echahidi	2007	*	*	*	-	-	*	*	-	5
El-Chami	2010	*	*	*	-	-	*	-	*	5
Farouk	2018	*	*	*	-	-	*	-	-	4
Musa										
Ghurram	2020	*	*	*	-	-	*	*	-	5
Gialdini	2014	*	*	*	*	**	*	*	-	8
Girerd	2012	*	*	*	-	-	*	*	-	5
Guenancia	2015	*	*	*	-	-	-	*	*	5
Horwich	2013	*	*	*	*	- / **	*	- / *	-	5/8
Hravnak	2002	*	*	*	*	-	*	-	-	5
Hu	2014	*	*	*	-	-	-	-	-	3
Iliescu	2018	*	*	*	-	-	*	-	-	4
Kalra	2019	*	*	*	-	**	*	*	-	7
Kim	2020	*	*	*	-	**	-	-	-	5
Kohno	2017	*	*	*	*	**	*	*	-	8
Konstantino	2016	*	*	*	-	- / **	*	* / *	*	6/8

Lapar	2014	*	*	*	*	**	*	-	-	7
Lee	2014	*	*	*	-	-	*	*	*	6
Lotfi	2011	*	*	*	*	-	*	-	-	5
Mariscalco	2014	*	*	*	*	**	*	-	-	7
Nisanolgu	2007	*	*	*	-	-	*	*	-	5
O'Neal	2013	*	*	*	-	-	*	*	-	5
Philip	2014	*	*	*	*	- / -	*	* / *	*	7/7
Pivatto	2014	*	*	*	*	-	*	-	-	5
Junior										
Rubin	1987	*	*	*	-	-	-	*	-	4
Saxena	2012	*	*	*	*	**	*	-	*	8
Shen	2011	*	*	*	-	-	*	-	-	4
Silva	2004	*	*	*	-	-	*	-	*	5
Stamou	2000	*	*	*	*	-	*	-	-	5
Swinkels	2017	*	*	*	*	-	*	*	-	6
Thoren	2020	*	*	*	-	**	*	*	-	7
Thoren	2014	*	*	*	-	-	*	-	-	4
Villareal	2004	*	*	*	-	**	*	-	*	7
Vlahou	2016	*	*	*	-	-	*	-	-	4
Vural	2019	*	*	*	-	-	-	-	-	3

Whitlock	2014	*	*	*	-	** / **	*	- / *	*	7/8
Yokota	2017	*	*	*	-	-	*	-	-	4
Zangrillo	2004	*	*	*	*	-	*	-	-	5
Zhao	2015	*	*	*	-	-	*	-	-	4

Footnotes: Study quality using the Newcastle Ottawa Scale for Observational Studies (Cohort Studies). Quality is reported separately (short-term/long-term) where applicable. Each star (\*) represents one point awarded for quality. A dash (-) represents no points awarded.

### Supplemental Table S2. Incidence of stroke stratified by follow-up length and surgical subtype.

		Studies	Patients	POAF Incidence (%)	Estimated Stroke Incidence (% or per 100 patient-years)		
					POAF	No POAF	Risk Difference
Short-term Strokes	All Studies	46	346957	33.6	4.46	2.45	2.01 (1.28 – 2.89)
	Isolated CABG	32	134216	25.2	2.70	1.25	1.45 (1.11 – 1.83)
	Valvular	9	131652	49.0	8.00	5.26	2.74 (0.79 – 5.37)
Long-term Strokes	All Studies	17	123533	21.0	1.06	0.88	0.18 (0.07 – 0.26)
	Isolated CABG	13	47736	27.3	1.10	0.90	0.20 (0.12 – 0.30)
	Valvular	3	2254	44.9	1.34	0.81	0.53 (0.11 – 1.13)



Footnotes: Perioperative atrial fibrillation (POAF) and stroke incidence stratified by length of follow-up and surgical subtype. Incidence is reported as absolute percentages for short-term strokes and per 100 patient-years for long-term strokes. The estimated incidences in the No POAF groups (i.e., baseline risk) are calculated from the event rates reported in all included studies. The estimated incidences in the POAF groups are calculated using the adjusted risk ratios derived from the meta-analyses and the estimated baseline risk.

**Supplemental Table S3. Summary of long-term studies reporting anticoagulation use.**

Study	N	Anticoagulation Type	Anticoagulation Use on Discharge (%)			Anticoagulation Use on Follow-up (%)			
			POAF	No POAF	Difference	Follow-Up (Years)	POAF	No POAF	Difference
Ahlsson 2010	571	Warfarin	3.6	1.2	2.4	6	8.3	3.9	4.4
Al-Khatib 2009	2794	Warfarin	23.4	4.7	18.7				
Batra 2019	8370	Unspecified	18.2	4.6	13.6	-	-	-	-
Benedetto 2020	3023	Warfarin	8.3	0.8	7.5	-	-	-	-
Conen 2020	4624	Warfarin	10.7	1.4	9.3	5	5.8	2.4	3.4
El-Chami 2010	16169	Warfarin	20.5	4.1	16.4				
Kohno 2017	157	VKA + NOAC	50	40	10	-	-	-	-
Konstantino 2016	136	Unspecified	18.9	5.05	3.7				
Lotfi 2011	3068	Warfarin	46	8	38				
Philip 2014	5135	Warfarin	7.1	3.6	3.5	-	-	-	-
Villareal 2004	6475	Unspecified	14	6.3	7.7				

Footnotes: POAF: perioperative atrial fibrillation; VKA: vitamin K antagonist; NOAC: non-vitamin K oral anticoagulant.

**Supplemental Table S4. Summary of results from subgroup analyses of isolated CABG vs. valvular surgery.**

<b>Follow-up Duration</b>	<b>Isolated CABG</b>	<b>Valvular Surgery</b>	<b>P-Value for Interaction</b>
Short-Term	RR 2.17 (1.89 – 2.49)	RR 1.52 (1.15 – 2.02)	0.03
Long-Term	RR 1.22 (1.13 – 1.33)	RR 1.65 (1.13 – 2.40)	0.13

Footnotes: RR: risk ratio; CABG: coronary artery bypass surgery.

**Supplemental Table S5. Summary of results from univariable meta-regression analyses.**

<b>Follow-up Duration</b>	<b>Moderators</b>	<b>Studies</b>	<b>Exp(b)</b>	<b>SE</b>	<b>t-Value</b>	<b>P-value</b>	<b>95% CI</b>
Long-Term	Anticoagulation on Discharge (Average %)	3	-	-	-	-	-
Long-Term	Follow-up (Average)	10	1.015	0.0111	1.33	0.221	0.989, 1.041
Long-Term	Study Size (n)	10	1.000	6.55e-07	-1.89	0.095	1.000, 1.000
Long-Term	Average or Median Age	7	-	-	-	-	-
Long-Term	% Female	9	-	-	-	-	-

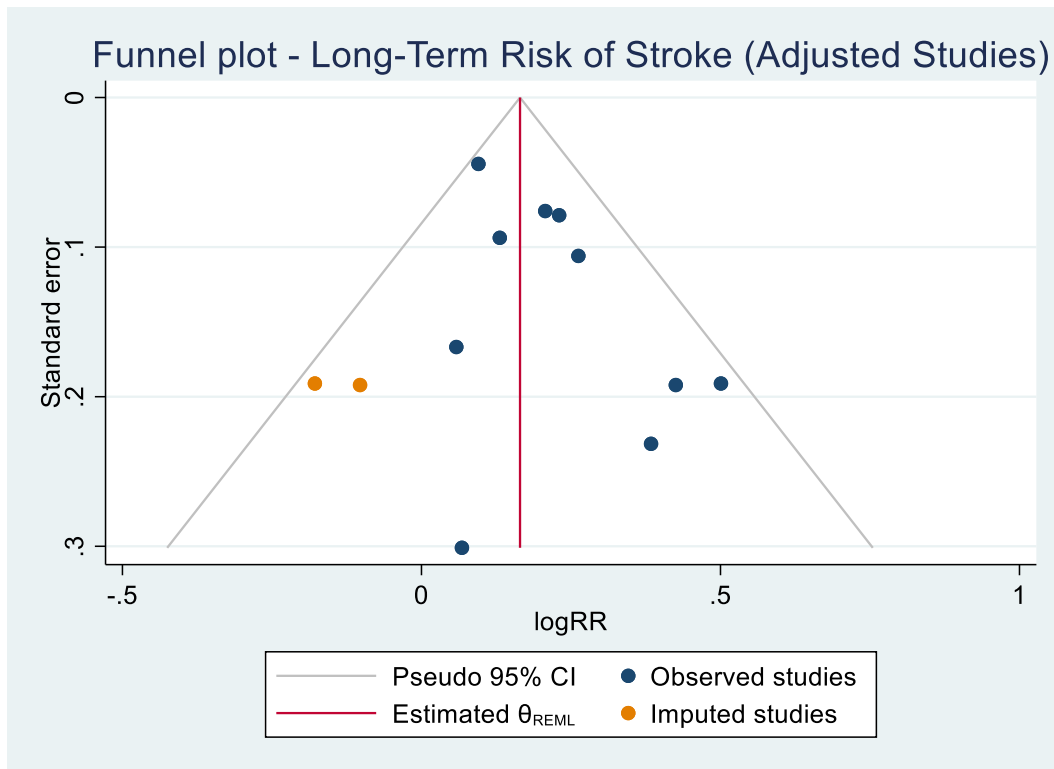
Footnotes: POAF: perioperative atrial fibrillation; Obs: observations; SE: standard error; CI: confidence interval.

**Supplemental Table S6. Sensitivity analyses for short- and long-term stroke risk.**

<b>Sensitivity Analysis</b>	<b>Short-Term Strokes</b>	<b>Long-Term Strokes</b>
All studies	RR 1.69 (1.41 – 2.03), I <sup>2</sup> = 82%	RR 1.20 (1.12 – 1.29), I <sup>2</sup> = 16%
High quality studies	RR 1.63 (1.32 – 2.01), I <sup>2</sup> = 87%	RR 1.20 (1.12 – 1.29), I <sup>2</sup> = 16%
Studies reporting ischemic/embolic strokes	No studies	RR 1.25 (1.12 – 1.38), I <sup>2</sup> = 8%
Studies published in the year 2010 or later	RR 1.67 (1.39, 2.02), I <sup>2</sup> = 83%	RR 1.20 (1.12 – 1.29), I <sup>2</sup> = 16%
POAF detection method	RR 1.57 (1.28, 1.93), I <sup>2</sup> = 84%	RR 1.20 (1.11 -1 .29), I <sup>2</sup> = 19%

Caption: AF: Atrial fibrillation. RR: risk ratio.

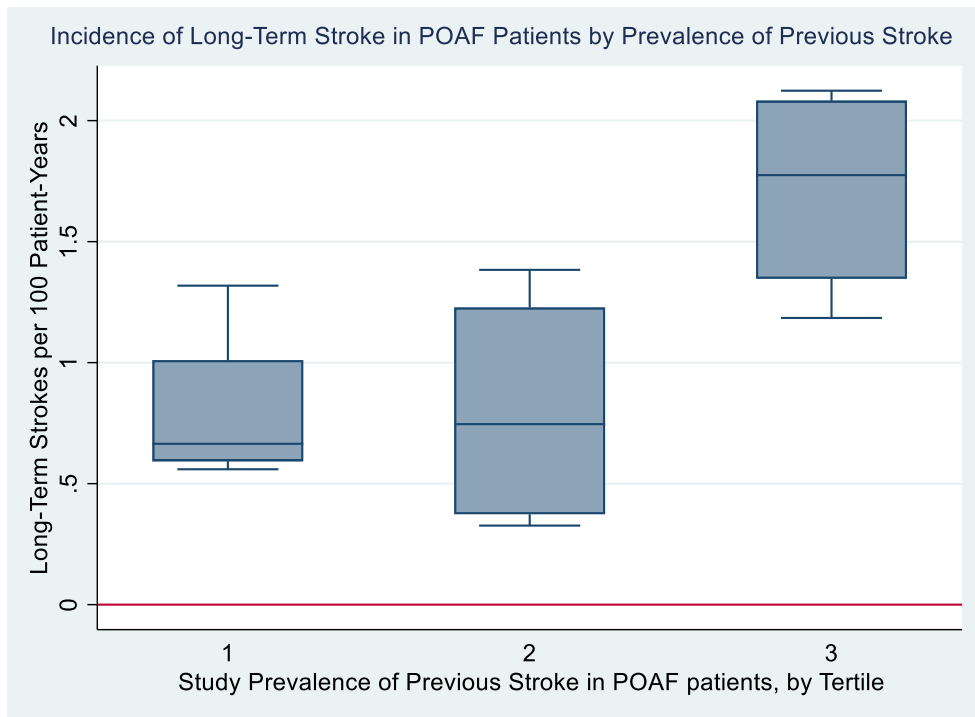
**Supplemental Figure S1. Publication bias assessment for studies reporting long-term stroke.**



Studies	n	RR	95% CI
Observed	10	1.21	1.12 – 1.30
Observed + Imputed	12	1.18	1.10 – 1.26

Legend: Publication bias of studies reporting long-term stroke outcomes was assessed by visual inspection of the funnel plot, followed by imputation of missing studies using the trim-and-fill method. RR: risk ratio. CI: Confidence interval.

**Supplemental Figure S2. Absolute risk of long-term stroke in patients with POAF by previous history of stroke.**



	<b>Tertile 1 [median, (IQR)]</b>	<b>Tertile 2 [median, (IQR)]</b>	<b>Tertile 3 [median, (IQR)]</b>
Previous Stroke Prevalence (%)	5.14 (1.50)	8.40 (0.17)	11.60 (2.32)
Long-Term Stroke Incidence (Per 100 patient-years)	0.66 (0.05)	0.75 (0.35)	1.77 (0.35)

Legend: Boxplot of the absolute risk of long-term stroke in patients with perioperative atrial fibrillation (POAF), with individual studies grouped into tertiles. Tertiles are ranked from the lowest to greatest prevalence of previous stroke reported in patients with POAF. IQR: Interquartile range.