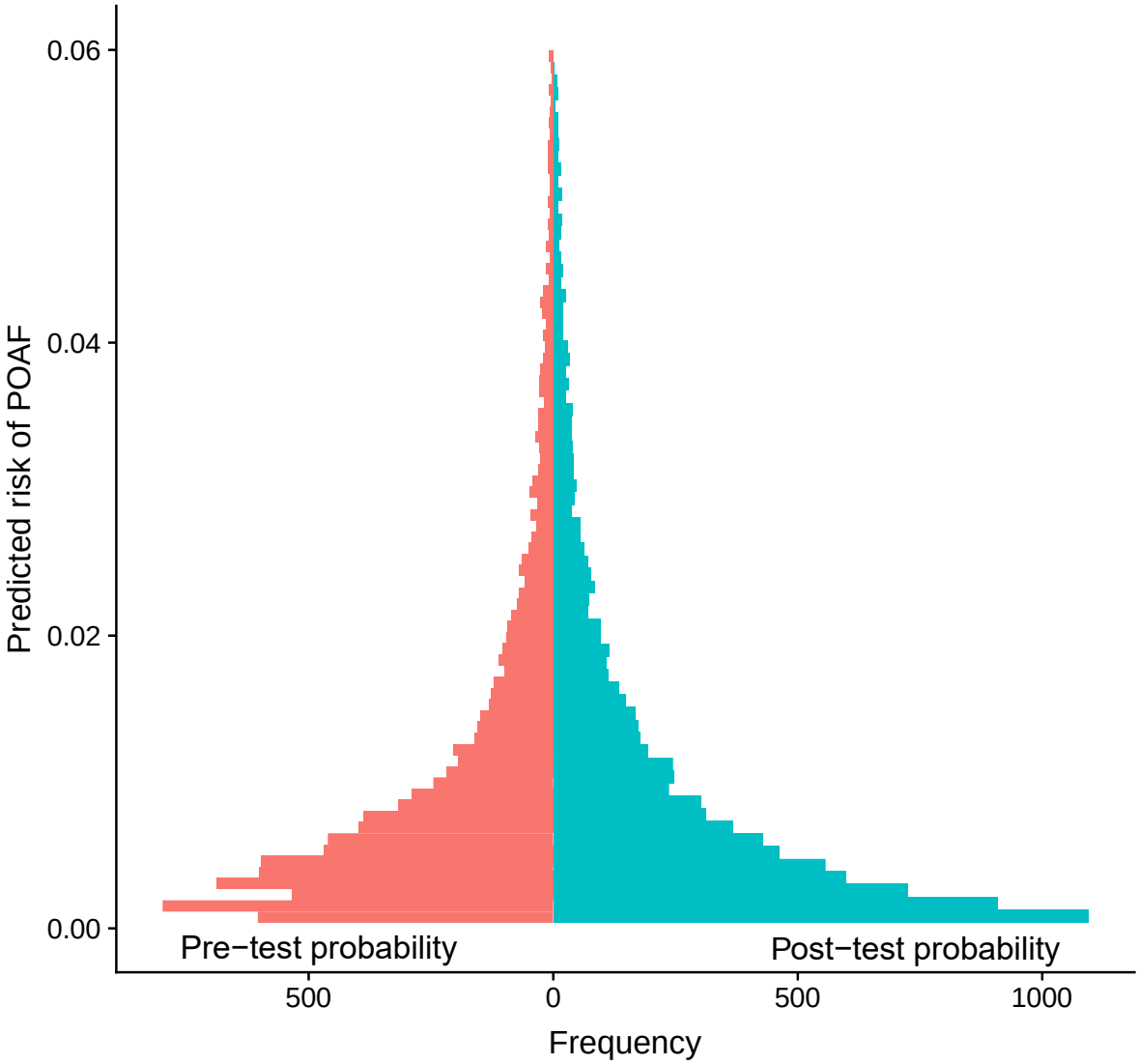
Appendix 1 (as submitted by the authors): Visualization of information provided by NT-proBNP measurement assessed by analyzing pre- and post-test probabilities.

A) Measures of added predictive value (fraction of new information from NT-proBNP)

```
pre <- predict(baseline_model, type='fitted') #pre-test prob
post <- predict(marker_model, type='fitted') #post-test prob

a <- baseline_model$stats['Model L.R.']
b <- marker_model$stats['Model L.R.']
c <- a/b
d <- 1-c
e  <-baseline_model$stats['R2']
f  <- marker_model$stats['R2']
g <- var(pre)
h <- var(post)
i <- g/h
j <- 1-i
br2 <- function(p) var(p) / (var(p) + sum(p * (1 - p)) / length(p))
k <- br2(pre)
l <- br2(post)
m <- k/l
n <- 1-m

Pre_test_LR_chi2 <- round(a, 2) #105.4
Post_test_LR_chi2 <- round(b, 2) #125.0
Adequacy_of_base_model <- round(c, 2) #0.84

Fraction_of_new_information_from_BNP <- round(d, 2) #0.16

Pre_test_R2 <- round(e, 3) #0.093
Post_test_R2 <- round(f, 3) #0.11
Variance_of_pre_test_risk <- round(g, 6) # 0.000166
Variance_of_post_test_risk <- round(h, 6) # 0.000195
Relative_explained_variation_1 <- round(i, 2) #0.85

Fraction_of_new_information_discrimination <-round(j, 2) #0.15
Pre_test_fraction_explained_risk <- round(k, 4) #0.015
Post_test_fraction_explained_risk <- round(l, 4) #0.0177
Relative_explained_variation_2 <-round(m, 2) #0.85

Fraction_of_new_information <- round(n, 2) #0.15
```

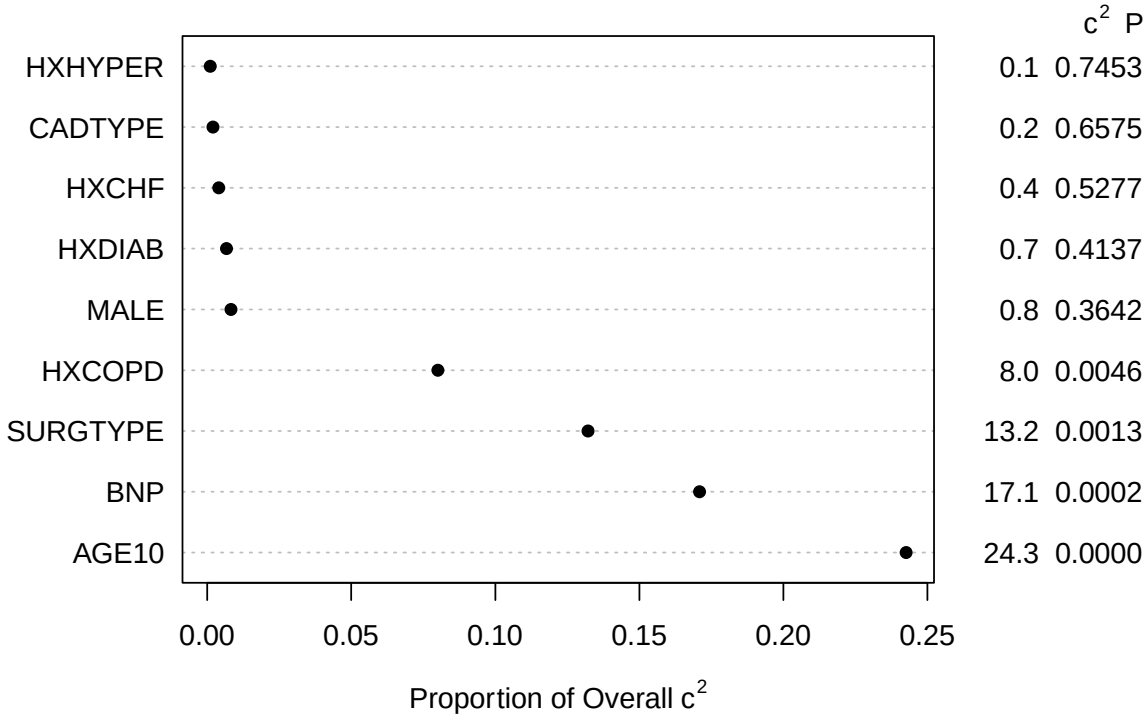
B) Histograms of predicted probabilites before (pre-test) and after (post-test) adding NT-proBNP to the baseline logistic regression model for POAF



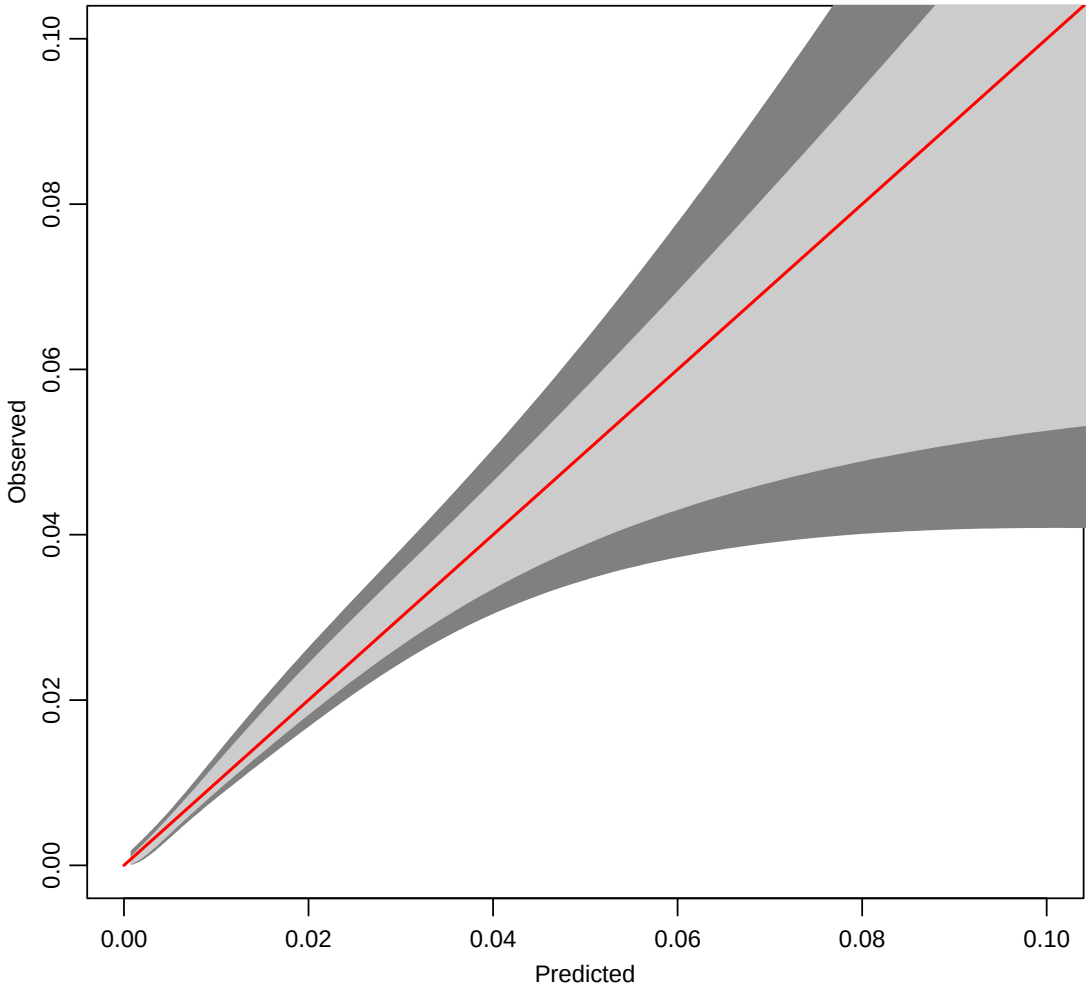
C) Biomarker model internal validation (bootstrap, n=500)

Index	Original Sample	Training Sample	Test Sample	Optimism	Corrected Index	n
D_{xy}	0.5872	0.6080	0.5663	0.0417	0.5455	500
R^2	0.1102	0.1210	0.1000	0.0210	0.0892	500
Intercept	0.0000	0.0000	−0.4235	0.4235	−0.4235	500
Slope	1.0000	1.0000	0.8908	0.1092	0.8908	500
$E_{\max}$	0.0000	0.0000	0.1184	0.1184	0.1184	500
D	0.0127	0.0139	0.0115	0.0024	0.0102	500
U	−0.0002	−0.0002	0.0002	−0.0004	0.0002	500
Q	0.0129	0.0141	0.0113	0.0028	0.0101	500
B	0.0109	0.0108	0.0109	−0.0001	0.0109	500
g	1.4576	1.5704	1.3833	0.1871	1.2705	500
g_p	0.0126	0.0130	0.0121	0.0010	0.0117	500

D) Relative importance of predictors in the biomarker model

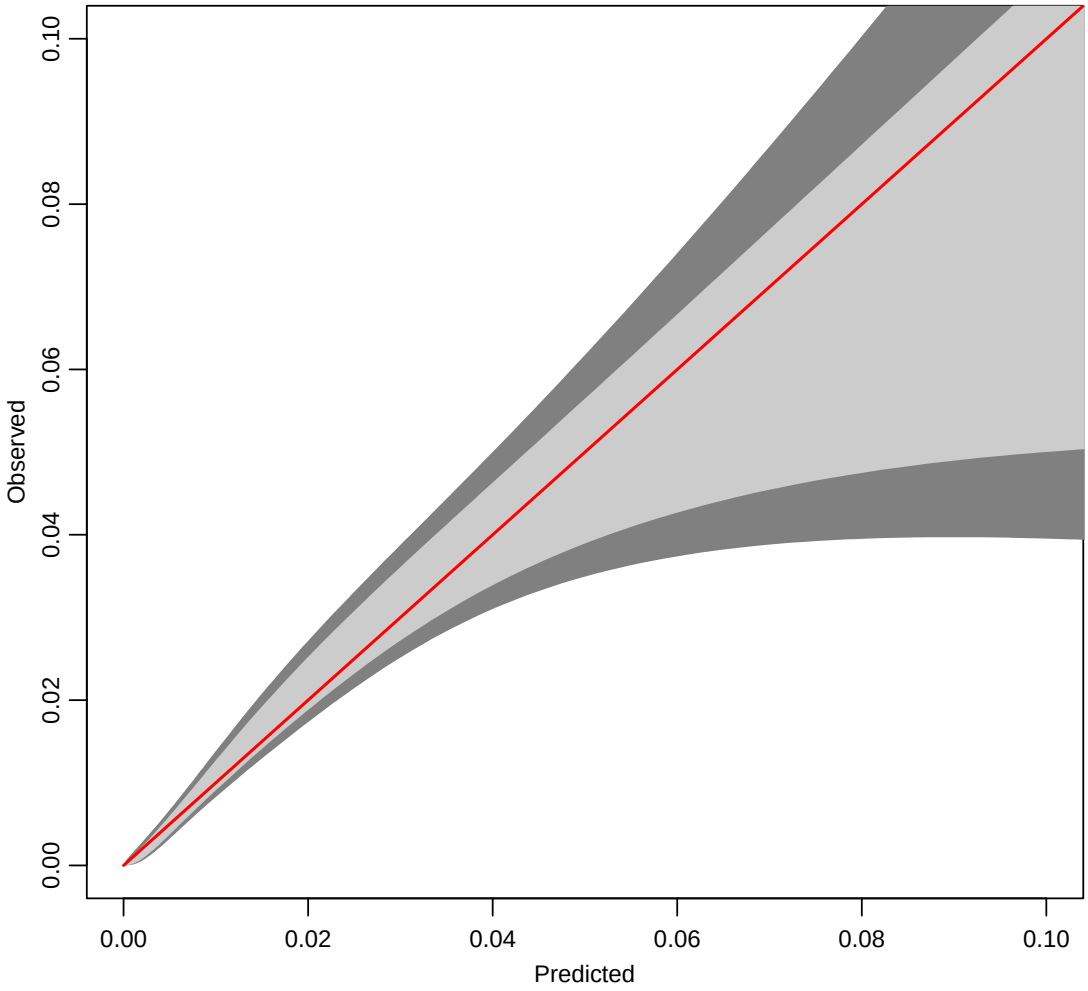


E) Calibration belt of the baseline model (without NT-proBNP)



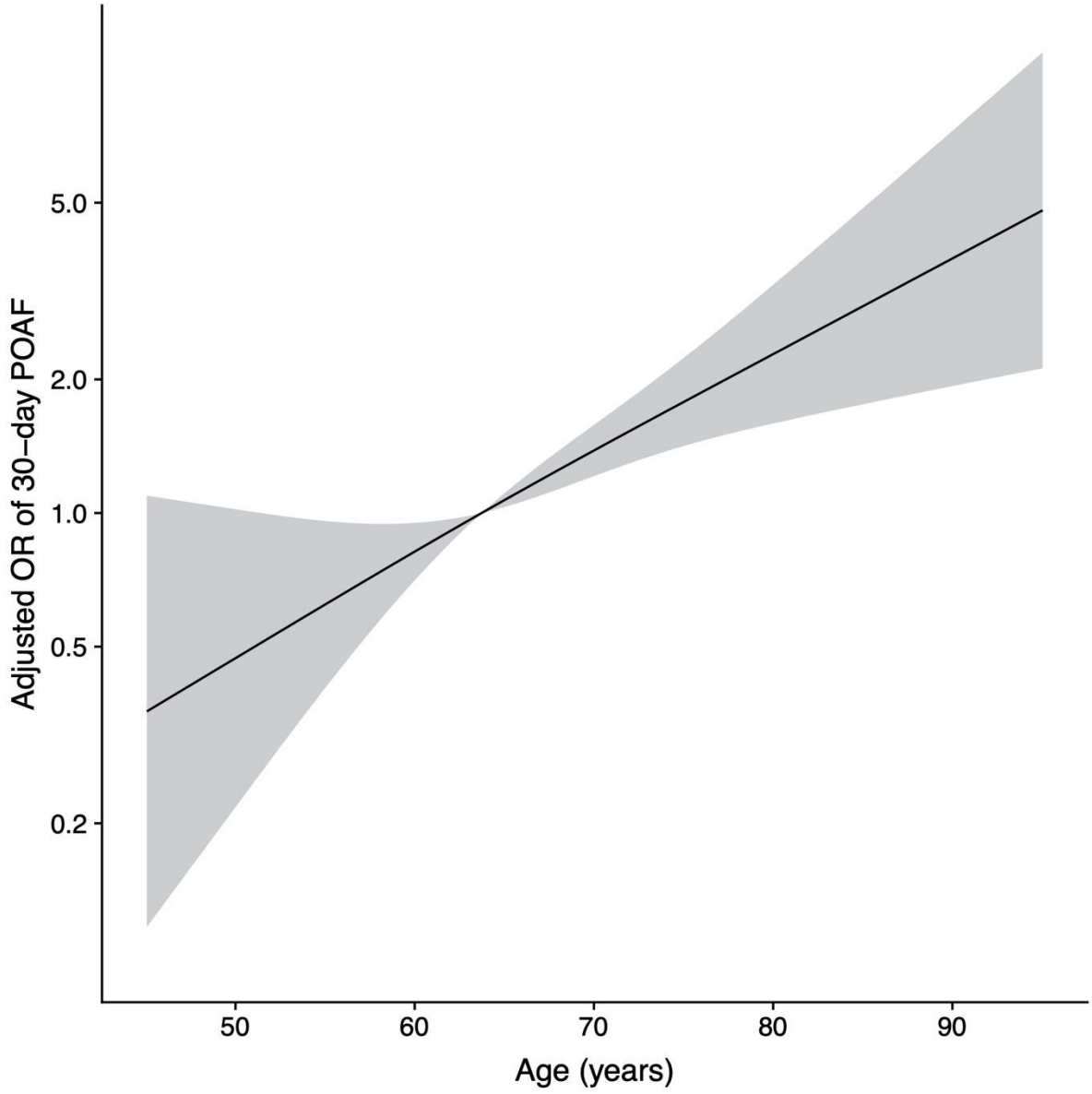
Footnote: The bisector (red line) represents perfect calibration; light grey area represents 80% confidence intervals; dark grey area represents 95% confidence intervals.

F) Calibration belt of the biomarker model
(after adding NT-proBNP to the baseline model)



Footnote: The bisector (red line) represents perfect calibration; light grey area represents 80% confidence intervals; dark grey area represents 95% confidence intervals.

G) Adjusted ORs for different values of age



ONLINE TABLES

Supplementary Table 1. Literature review of studies describing incidence of POAF in patients undergoing non-cardiac surgeries

Study	Design	Population	Inclusion of urgent/emergent procedures	Exclusion of patients with previous history of AF	Number of events	Incidence
Non-cardiac, thoracic						
Amar, 2000(1)	Prospective, interventional	163	Not specified	Yes	40	**24.5%***
Passman, 2005(2)	Retrospective	856	No	Yes	147	**17.2%**
Roselli, 2005(3)	Retrospective	604	Not specified	No	113	**18.7%**
Cardinale, 2007(4)	Prospective	400	No	Yes	72	**18.0%**
Riber, 2012(5)	Prospective, interventional	120	No	Yes	38	**31.7%**
Rao, 2012(6)	Retrospective	997	Not specified	Yes	209	**21.0%**
Ciszewski, 2013	Prospective	117	Not specified	Yes	19	**16.2%**
Berry, 2014(7)	Retrospective	1 412	Not specified	Yes	232	**16.4%**
Gialdini, 2014(8)	Registry	35 992	Not specified	Yes	1337	**3.7%**
Cardinale, 2016‡ (9)	Prospective, interventional	911	Not specified	Yes	75	**8.2%**
Lee, 2016(10)	Retrospective	4 662	No	Yes	555	**11.9%**
Chin, 2016(11)	Retrospective	583	No	Yes	63	**10.8%**
Butt, 2018 (12)**	Registry	1 520 109	Not specified	Yes	6048	**0.4%**
Nielsen, 2004(13)	Retrospective	200	No	No	78	**39.0%**
Imperatori, 2012(14)	Prospective	454	No	Yes	45	**9.9%**
Non-cardiac, nonthoracic						
Brathwaite, 1998(15)	Prospective	404	Not specified	Yes	31	**7.7%**
Polanczyk, 1998(16)	Prospective	4 181	No	No	256	**4.1%**
Sohn, 2009(17)	Retrospective	7 756	Yes	Yes	30	**0.4%**
Gialdini,	Registry	1 606 951	Not specified	Yes	11537	**0.7%**

2014(8)						
Blackwell, 2015(18)	Registry	4 345	No	Yes	210	**4.8%**
Kothari, 2016(19)	Registry	15 148	Yes	Yes	554	**3.7%**
Nassoiy, 2016(20)	Registry	5 065	Not specified	Yes	408	**8.1%**
Bhave, 2012[+] (21)	Registry	363 092	Not specified	Yes	3602	**1.0%**
POISE Study Group, 2008[†] (22) (23)	Prospective, interventional	4177	Yes	No	120	**2.9%**
POISE-2 Study Group, 2014[†(24)]	Prospective, interventional	10 010	Yes	No	203	**2.0%**
Xia, 2015(25)	Retrospective	1387	Not specified	No	102	**7.4%**
Leibowitz, 2017(26)	Retrospective	410	Not specified	Yes	15	**3.7%**

Footnotes: In interventional studies (Amar, Cardinale, Riber, POISE) patients randomized to intervention groups are not presented in this table.
* number includes atrial fibrillation and atrial flutter;
‡ patients with elevated BNP levels that were assigned to the intervention line with antiarrythimc treatmens (n= 205) were excluded;
[+] 2.2% of patients underwent thoracic surgery;
[†] study included patients who underwent thoracic surgeries;
[**] study includes 31,192 patients undergoing thoracic surgery among whom POAF incidence was 2.7%

References to Supplementary Table 1:

1. Amar D, Roistacher N, Rusch VW et al. Effects of diltiazem prophylaxis on the incidence and clinical outcome of atrial arrhythmias after thoracic surgery. J Thorac Cardiovasc Surg 2000;120:790-8.
2. Passman RS, Gingold DS, Amar D et al. Prediction rule for atrial fibrillation after major noncardiac thoracic surgery. Ann Thorac Surg 2005;79:1698-703.
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14. Imperatori A, Mariscalco G, Riganti G, Rotolo N, Conti V, Dominioni L. Atrial fibrillation after pulmonary lobectomy for lung cancer affects long-term survival in a prospective single-center study. J Cardiothorac Surg 2012;7:4.
15. Brathwaite D, Weissman C. The new onset of atrial arrhythmias following major noncardiothoracic surgery is associated with increased mortality. Chest 1998;114:462-8.
16. Polanczyk CA, Goldman L, Marcantonio ER, Orav EJ, Lee TH. Supraventricular arrhythmia in patients having noncardiac surgery: clinical correlates and effect on length of stay. Ann Intern Med 1998;129:279-85.
17. Sohn GH, Shin DH, Byun KM et al. The incidence and predictors of postoperative atrial fibrillation after noncardiothoracic surgery. Korean Circ J 2009;39:100-4.
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19. Kothari AN, Halandras PM, Drescher M et al. Transient postoperative atrial fibrillation after abdominal aortic aneurysm repair increases mortality risk. Journal of vascular surgery 2016;63:1240-7.
20. Nassoiy SP, Blackwell RH, Kothari AN et al. New onset postoperative atrial fibrillation predicts long-term cardiovascular events after gastrectomy. Am J Surg 2016;211:559-64.
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Supplementary Table 2. List of participating centers.

Continent	Country	Center
North America	Canada	Juravinski Hospital and Cancer Centre, Hamilton
		Saint Joseph's Healthcare, Hamilton
		Hamilton General Hospital, Hamilton
		McMaster University Medical Centre, Hamilton
		Health Sciences Centre Winnipeg, Winnipeg
		Walter C. MacKenzie Health Sciences Centre, Edmonton
		Victoria Hospital, London
	United States	Cleveland Clinic, Cleveland
		Washington University School of Medicine, St. Louis
Asia	China	Prince of Wales Hospital, Hong Kong
	India	St. John's Medical College Hospital, Bangalore
		Christian Medical College, Ludhiana
	Malaysia	University Malaya Medical Centre, Kuala Lumpur
Europe	United Kingdom	Barts And The London, London
		University College Hospital, London
		Leeds Teaching Hospitals, Leeds
		Royal Liverpool University Hospital, Liverpool
	Spain	Hospital de Sant Pau, Barcelona
		Hospital Gregorio Maranon, Madrid
	Poland	Jagiellonian University Medical College, Kraków
	France	Pitie-Salpetriere Hospital, Paris
South America	Brazil	Hospital do Coracao, São Paulo
		Hospital de Clinicas de Porto Alegre, Porto Alegre
	Colombia	Hospital Universitario de Santander, Bucaramanga
	Peru	Foundation CardioInfanil, Bogota
		Hospital Nacional Cayetano Heredia, Lima
Africa	South Africa	Inkosi Albert Luthuli Hospital, Durban
Australia	Australia	Westmead Hospital, Sydney

Supplementary Table 3. STROBE Statement Checklist of items that should be included in reports of cohort studies.

	Item No	Recommendation	Page/Table/ Figure
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	**p. 1**
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	**p. 2**
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	**p. 3**
Objectives	3	State specific objectives, including any prespecified hypotheses	**p. 3**
Methods			
Study design	4	Present key elements of study design early in the paper	**p. 3-4**
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	**p. 4**
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up	**p. 4**
		(*b*) For matched studies, give matching criteria and number of exposed and unexposed	**NA**
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	**p. 3-5**
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	**p. 4-5**
Bias	9	Describe any efforts to address potential sources of bias	**p. 5-6**
Study size	10	Explain how the study size was arrived at	**p. 4**
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	**p. 5-6**
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	**p. 5-6**
		(*b*) Describe any methods used to examine subgroups and interactions	**p. 5-6**
		(*c*) Explain how missing data were addressed	**p. 5-6**
		(*d*) If applicable, explain how loss to follow-up was addressed	**p. 5-6**
		(*e*) Describe any sensitivity analyses	**p. 5-6**
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	**p. 6-7**
		(b) Give reasons for non-participation at each stage	**p. 6-7**
		(c) Consider use of a flow diagram	**Fig.1**
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	**p. 6-7** **Tab. 1**
		(b) Indicate number of participants with missing data for each variable of interest	**p. 6-7** **Tab. 1**
		(c) Summarise follow-up time (eg, average and total amount)	**p. 4** **Fig. 1**
Outcome data	15*	Report numbers of outcome events or summary measures over time	**p. 7**
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	**p. 6-8** **Tab. 1-2** **Fig. 3**
		(*b*) Report category boundaries when continuous variables were categorized	**NA**

		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	**NA**
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	**Supplement**
Discussion			
Key results	18	Summarise key results with reference to study objectives	**p. 8**
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	**p. 10**
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	**p. 11**
Generalisability	21	Discuss the generalisability (external validity) of the study results	**p. 8-9**
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	**p. 1**

Supplementary Table 4. Demographic and clinical characteristics stratified for occurrence of new onset clinically important POAF in patients who had NT-proBNP measured before surgery– a univariable analysis.

	Patients with NT-proBNP measurement and without POAF within 30 days after surgery N=9680		*Patients with NT-proBNP measurement and with POAF within 30 days after surgery N=109*		*p-value*
	n	%	n	%	
Demographics					
Age	64.2 (10.9)		73.3 (10.5)		<0.001
Female	4909	49.3%	50	45.9%	0.363
Frail	366	3.8%	6	5.5%	0.495
Smoking history					
History of smoking	8162	84.3%	93	85.3%	
Current smoker	4698	48.6%	40	36.7%	0.017
Former smoker	3464	35.8%	53	48.6%	
Medical History					
Coronary artery disease	1250	12.9%	27	24.8%	<0.001
Recent high-risk CAD	76	0.8%	2	1.8%	0.22
Congestive heart failure	219	2.3%	5	4.6%	0.197
Aortic stenosis	87	0.9%	5	4.6%	0.001
Peripheral vascular disease	684	7.1%	13	11.9%	0.076
History of CVE	593	6.1%	9	8.3%	0.47
History of DVT/PE	360	3.7%	1	0.9%	0.19
Hypertension	5013	51.8%	70	64.2%	0.013
Diabetes	1916	19.8%	27	24.8%	0.24
Chronic obstructive pulmonary disease	724	7.5%	22	20.2%	<0.001
Obstructive sleep apnea	607	6.3%	7	6.4%	1.0
Pre-operative medications ≤24h before surgery					
Beta-blockers	1619	16.7%	23	21.1%	0.278
Rate controlling calcium channel blocker	203	2.1%	3	2.8%	0.891
Pre-operative medications >24h to 7 days before surgery					
Beta-blockers	1808	18.7%	27	24.8%	0.135
Rate controlling calcium channel blocker	233	2.4%	1	0.9%	0.485
Surgery					
Urgent/Emergent	415	4.3%	9	8.3%	0.074
Thoracic surgery	255	2.6%	5	4.6%	<0.001

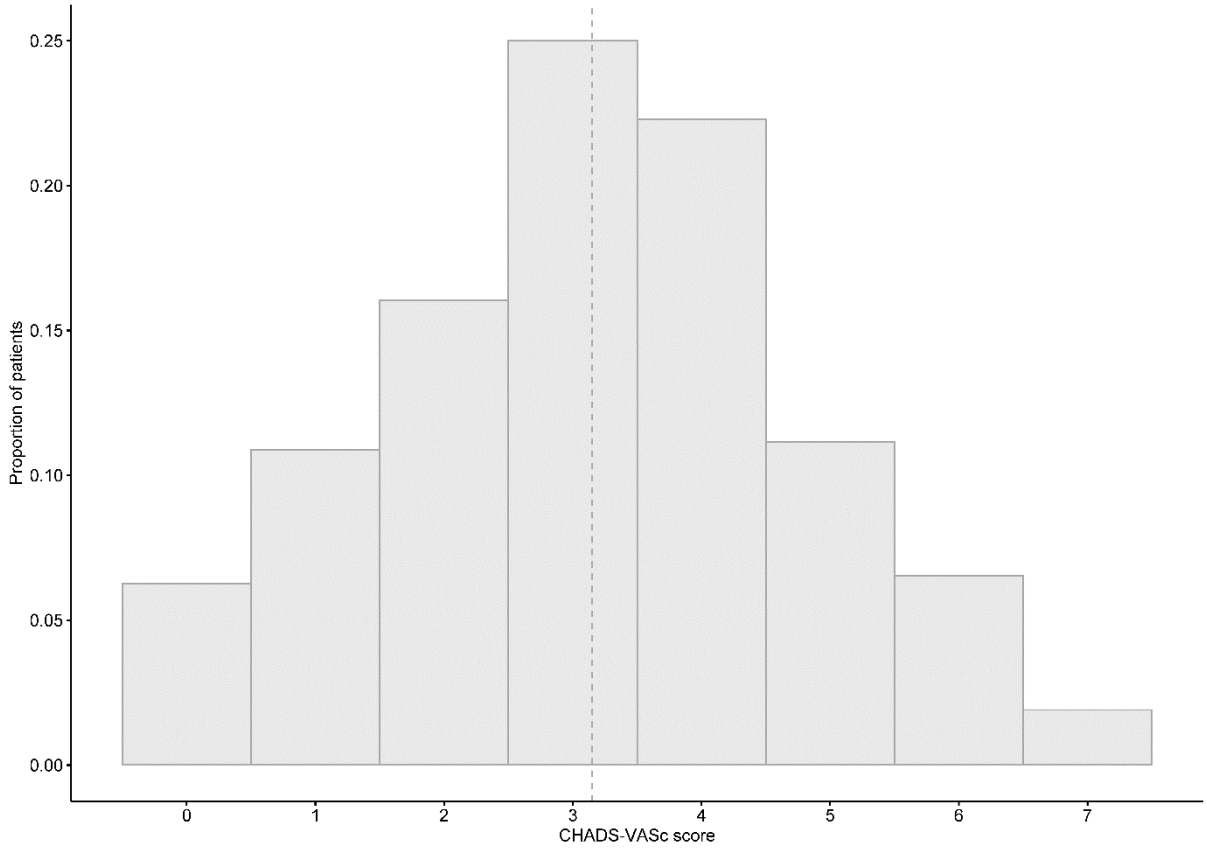
Major nonthoracic surgery	6447	66.6%	94	86.2%	
Other surgeries	2978	30.8%	10	9.2%	
Type of anesthesia					
General anesthesia	5649	58.4%	56	51.4%	
Regional anesthesia	2706	28.0%	27	24.8%	0.009
Combined general and regional anesthesia	1318	13.6%	26	23.9%	
Hemoglobin, g/L					
Mean (SD)	132.9 (17.7)		128.4 (18.7)		
Median (IQR)	132 (120-143)		128 (113-140)		0.02
eGFR, ml/minute/1.73m2					
Mean (SD)	79.4 (22.0)		69.7 (23.1)		
Median (IQR)	83.0 (67.0-94.9)		76.4 (51.8 – 87.1)		<0.001

Supplementary Table 5. Demographic and clinical characteristics of patients with and without NT-proBNP measurement– a univariable analysis.

	Patients with NT-proBNP measurement N=9789		*Patients without NT-proBNP measurement N=27875*		*p-value*
	n	%	n	%	
Demographics					
Age	64.3 (11.0)		63.2 (11.1)		<0.001
Female	4830	49.3%	13941	50.0%	0.258
Frail	372	3.8%	1716	6.2%	<0.001
Smoking history					
History of smoking	8255	84.3%	24055	86.3%	
Current smoker	4738	48.5%	15474	55.6%	<0.001
Former smoker	3517	36.0%	8581	30.8%	
Medical History					
Coronary artery disease	1277	13.0%	3041	10.9%	<0.001
Recent high-risk CAD	78	0.8%	235	0.8%	0.66
Congestive heart failure	224	2.3%	688	2.5%	0.339
Peripheral vascular disease	697	7.1%	2106	7.6%	0.165
History of CVE	602	6.1%	1570	5.6%	0.062
Hypertension	5083	51.9%	13361	47.9%	<0.001
Diabetes	1943	19.8%	5787	20.8%	0.056
COPD	746	7.6%	1999	7.2%	0.147
Surgery					
Urgent/Emergent	424	4.3%	3430	12.3%	<0.001
Thoracic surgery	260	2.7%	828	3.0%	
Major nonthoracic surgery	6541	66.8%	16267	58.4%	<0.001
Other surgeries	2988	30.5%	10780	38.7%	
Type of anesthesia					
General anesthesia	5705	58.3%	17443	62.7%	
Regional anesthesia	2733	27.9%	7487	26.9%	<0.001
Combined anesthesia	1344	13.7%	2900	10.4%	
Hemoglobin, g/L					
Median (IQR)	134.0 (123.0-145.0)		131.0 (118.0-143.0)		<0.001
eGFR, ml/minute/1.73m2					
Median (IQR)	82.9 (66.9-94.9)		85.3 (67.8-97.9)		<0.001
Outcomes					
POAF	109	1.1%	260	0.9%	0.133
Vascular death in 30 days	44	0.4%	219	0.8%	0.001
Myocardial infarction in 30 days	330	3.4%	861	3.1%	0.180
Non-fatal cardiac arrest in 30 days	9	0.1%	31	0.1%	0.747

ONLINE FIGURES

Supplementary Figure 1. Histogram of CHA_2DS_2-VASc scores among patients who developed perioperative atrial fibrillation.



Footnote: Dashed line represents median CHA_2DS_2-VASc score.