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Impact of Oral Anticoagulation on Clinical Outcomes in Postoperative Atrial Fibrillation

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ABSTRACT

Introduction: The impact of postoperative oral anticoagulation (OAC) with warfarin on postoperative atrial fibrillation (POAF) after coronary artery bypass grafting (CABG) was the focus of this examination of patients from the randomized endo-vein graft prospective (REGROUP) Trial.

Material and methods: REGROUP was a prospective randomized Veterans Affairs cooperative study comparing endoscopic *versus* open vein harvest in elective CABG patients (March 2014-April 2017) at 16 Veterans Affairs facilities. This study compared new-onset POAF patients who were treated with warfarin *versus* no-warfarin. Outcomes included stroke during active follow-up and a major adverse cardiac event composite of mortality, acute myocardial infarction, and repeat revascularization during active and passive follow-up.

Results: Of the 316/1103 (28.6%) of REGROUP patients who developed new-onset POAF, 45 patients were excluded - mainly for preoperative warfarin use. Of the remaining 269 patients, 85 received OAC with warfarin (OAC group); 184 did not (no-OAC group). Stroke rates during active follow-up (32 [IQR 24-38] mo) were 3.5% OAC group *versus* 5.4% no-OAC group ($P = 0.76$); major adverse cardiac eventrates were 20% OAC *versus* 11.4% no-OAC ($P = 0.06$). On longer follow-up of (median 4.61 [IQR 3.9-5.1] y), discharge OAC use was associated with all-cause mortality after adjusting for Society of Thoracic Surgeons mortality risk (20.0% *versus* 11.4% no-OAC use; HR = 2.00, 95% CI: 1.05-3.81, $P = 0.035$).

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Conclusions: REGROUP patients with POAF treated with OAC had similar stroke and higher mortality rates *versus* no-OAC patients. Further investigation of the risk-benefit ratio of OAC in post-CABG patients and which POAF patient subgroups might derive the most benefit with anticoagulation appears warranted.

Introduction

New-onset postoperative atrial fibrillation (POAF) remains the most common complication following coronary artery bypass grafting (CABG). There are multiple published reports on the adverse impact of POAF on clinical outcomes.[1-7] The association of nonsurgical atrial fibrillation (AF) with stroke and thromboembolism[8-10] and the use of oral anticoagulation (OAC) for risk reduction has also been well documented in the literature[10-12]; however, there are few prospective studies that examine the impact of OAC on stroke and clinical outcomes in CABG patients with POAF. In addition, the management of POAF has largely been based on algorithms developed for nonsurgical AF.[12-14] To address this knowledge gap, we examined the impact of OAC, using warfarin, on clinical outcomes in CABG patients with POAF enrolled in the randomized endo-vein graft prospective (REGROUP) trial.

Methods

This subgroup analysis was based on the Cooperative Studies Program Study #588, also known as the REGROUP Trial. REGROUP was a multicenter prospective randomized study, funded by the Department of Veterans Affairs (VA) Cooperative Studies Program, that compared endoscopic *versus* open vein harvesting techniques in 1150 patients undergoing elective CABG between March 2014 and April 2017, at 16 VA medical centers.[15] The trial was approved by the institutional review board at each participating institution. Patients provided informed consent prior to randomization. Patients were contacted by a dedicated research nurse every 3 mo for at least 1 y post procedure. The primary outcome during the active follow-up period was a major adverse cardiac event (MACE) composite consisting of all-cause mortality, nonfatal acute myocardial infarction (AMI), and repeat revascularization either by percutaneous coronary intervention or repeat CABG. Individual MACE components were separately assessed as well as stroke rates. MACE and its components were further assessed during the combined active + passive follow-up periods.[16]

As a preapproved subanalysis, data on POAF were prospectively collected. New-onset POAF was defined as any atrial-based irregular rhythm lasting at least 30 min that did not exist prior to the CABG procedure. Patients who developed POAF during their post-CABG hospitalization were compared based on whether they were newly started on OAC with warfarin (OAC group) *versus* or not (no-OAC group). Because the treatment protocol for postoperative atrial flutter (POAFl) was similar to POAF, patients with postoperative atrial flutterwere included. Patients with a history of preoperative AF and those on OAC were excluded from this subanalysis.

Data collection

Preoperative patient demographics, intraoperative processes of care, and postoperative outcome data were gathered by a dedicated research nurse at each participating center. Patients were followed by the research nurse at discharge, 6 wk, and then every 3 mo thereafter for at least 1 y after surgery. POAF-related data were collected prospectively including the postoperative day (POD) of occurrence, antiarrhythmic treatment strategy, rhythm status at the time of discharge, and warfarin use at discharge and at 3-mo intervals up to 2 y. Patients were followed for the components of MACE (all-cause death, repeat revascularization, and AMI), cardiac-related death, and stroke.

Data analysis

Descriptive statistics included means (standard deviations) for continuous variables and percentages for categorical variables. Bivariate analyses were employed to assess participant differences for those with POAF *versus* without POAF. For categorical data, the Chi-square test was applied, or in cases where there were >20% of cells with expected frequencies <5, Fisher's exact test was applied. For continuous variables the Shapiro–Wilk test was used to check normality, and two-sample *t*-tests were applied for variables with normal distribution and the Wilcoxon rank-sum test in cases where the normal distribution assumption was not met. Within the POAF group, Cox proportional hazards regression was performed to investigate the association of OAC use with all-cause and cardiac-related mortality, MACE, and stroke, adjusting for CHA_2DS_2-VASc scores. The sensitivity of the results was further assessed by adjusting for Society of Thoracic Surgeons (STSs) mortality risk scores. A type I error rate of 0.05 was assumed throughout. Statistical analyses were conducted with SAS statistical software, version 9.4 (SAS Institute).

Results

Of the 1150 patients randomized in REGROUP, 47 patients (4.1%) were excluded due to preoperative AF or flutter, permanent pacemaker, or because of an uncertain history of AF at baseline (CONSORT Diagram, Fig. 1). Of the remaining 1103 patients, 316 (28.6%) patients developed new-onset POAF during their hospitalization. Patients with POAF were older and had higher VA Surgical Quality Improvement Program and STS risk scores (Table 1). Of the 316 patients with POAF, 45

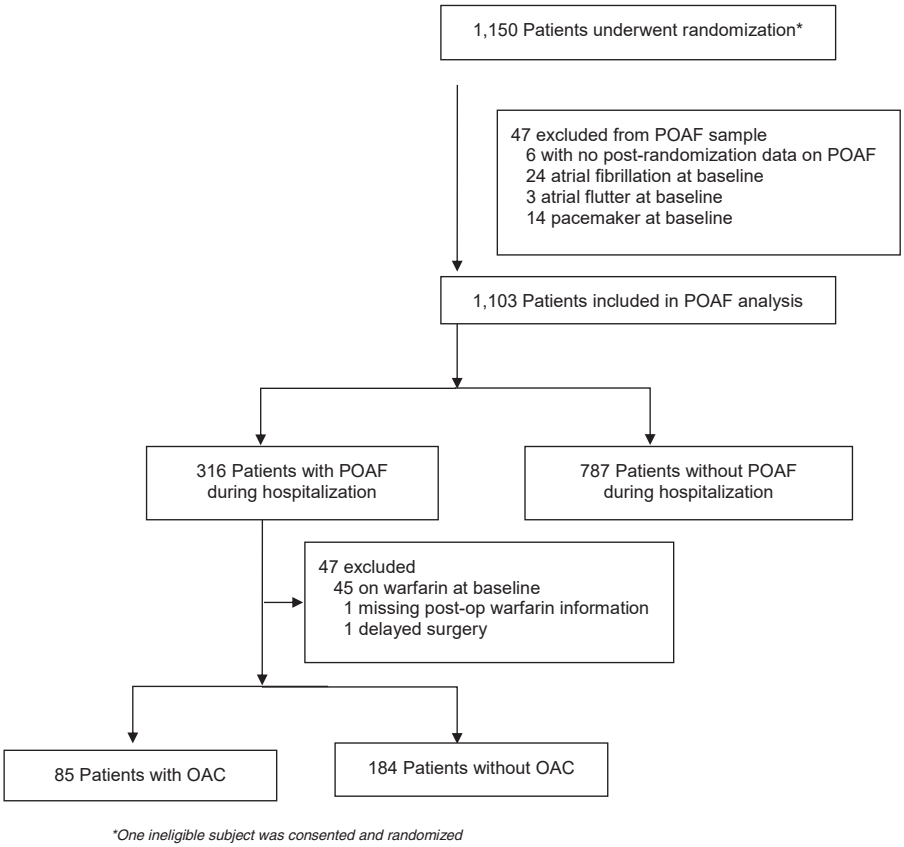

Fig. 1 – CONSORT diagram of enrolled patients in the randomized endovein graft prospective (REGROUP) trial who developed postoperative atrial fibrillation (POAF) and were treated with oral anticoagulation with oral anticoagulation (OAC) with warfarin *versus* no-OAC (no warfarin).

patients were excluded from this analysis because they were already taking warfarin before surgery; 2 additional patients were excluded for other reasons (CONSORT Diagram, Fig. 1). In the remaining 269 patients, 85 were prescribed OAC with warfarin (31.6%), and 184 patients (68.4%) were not prescribed warfarin. Patients characteristics of the two comparative groups are presented in Table 2. There were no baseline clinical differences between the OAC and no-OAC groups. The CHA_2DS_2-VASc median scores were 3.0 in both groups. Median time to POAF was on POD 2 (IQR POD 2-3) with the majority of patients developing POAF within the first 5 d after surgery.

Of the 206 patients with data on amiodarone use and rhythm status at the time of discharge, most (186/206, 90.3%) were in sinus rhythm at the time of discharge. Of the 186 patients in sinus rhythm, 133 (71.5%) patients were discharged with no OAC. Of the 20 patients with recorded AF or Aflutter at discharge, 16 patients (80.0%) were discharged with OAC. Among the 137 patients in the no-OAC group, 103 (75.2%) were discharged with amiodarone (Table 3).

Median and mean follow-up times for the active phase were 32 mo (IQR 24-38 mo) and 30.3 (SD = 10.5 mo), respectively. For the combined active + passive follow-up phases, median and mean follow-up were 4.61 y (IQR 3.88-5.14) and 4.32 y (SD = 1.26), respectively. POAF patients on OAC showed significantly greater risk for MACE (20.0% *versus* 11.4%; unadjusted HR = 1.917, 95% CI: 1.011-3.634, $P = 0.046$), all-cause death (14.1% *versus* 5.4%; HR = 2.712, 95% CI: 1.171-6.280, $P = 0.020$), and cardiac mortality (7.1% *versus* 1.1%; HR = 6.865, 95% CI: 1.385-34.03, $P = 0.018$) during the active follow-up phase (Table 4). Stroke was seen in 3 (3.5%) POAF patients on OAC *versus* 10 (5.4%) POAF patients not receiving OAC ($P = 0.76$) and AMI in 6 (7.1%) POAF patients on OAC *versus* 4 (2.2%) POAF patients not receiving OAC ($P = 0.08$). No significant difference in repeat revascularization was observed. Similar associations were observed after adjusting for the CHA_2DS_2-VASc and STS mortality score, with the exception of AMI. Unadjusted OAC associated with AMI trended toward significance, becoming significant after adjusting for STS risk of mortality but not CHA_2DS_2-VASc. Including passive follow-up, the association between OAC and MACE was no longer significant, while all-cause mortality differences remained significant (20.0% *versus* 11.4%; CHA_2DS_2-VASc adjusted HR = 2.302, 95% CI: 1.080-4.907, $P = 0.031$).

A review of postoperative warfarin use showed that most patients who were discharged with warfarin were taken off their anticoagulation by 12 mo; in contrast, only four patients who were not discharged with warfarin were subsequently started (Fig. 2). Of note, on review of serious adverse events that occurred during postoperative follow-up, the OAC group was noted to have an overall higher rate of adverse events (82.4% *versus* 66.3% for no-OAC group; $P = 0.007$; Supplemental

Table 1 — Baseline patient demographics of POAF *versus* no POAF patients.

Demographics	POAF ($n = 316$)	No POAF ($n = 787$)	Total ($n = 1103$)	P-value*
Age in years - median (Q1,Q3)	68.2 (64, 72)	66.1 (62, 70)	66.9 (63, 70)	<0.001[4]
White (*versus* all other) — *n* (%)	280 (88.6)	650 (82.6)	930 (84.3)	0.013[1]
Smoking last use — *n* (%)				0.050[1]
Never smoked	74 (23.4)	177 (22.5)	251 (22.8)	
<3 mo prior to surgery	67 (21.2)	213 (27.1)	280 (25.4)	
≥3 mo but <1 y prior to surgery	4 (1.3)	24 (3.0)	28 (2.5)	
≥1 y prior to surgery	169 (53.5)	371 (47.1)	540 (49.0)	
Missing	2 (0.6)	2 (0.3)	4 (0.4)	
Chronic lung disease — *n* (%)	62 (19.6)	149 (18.9)	211 (19.1)	0.793[1]
Serum creatinine ≥1.5 mg/dL — *n* (%)	28/284 (9.9)	38/538 (7.1)	66/822 (8.0)	0.161[1]
Cerebrovascular accident (CVA) — *n* (%)	27 (8.5)	62 (7.9)	89 (8.1)	0.713[1]
Peripheral vascular disease — *n* (%)	41 (13.0)	103 (13.1)	144 (13.1)	0.960[1]
Hypertension — *n* (%)	286 (90.5)	707 (89.8)	993 (90.0)	0.736[1]
Diabetes — *n* (%)	164 (51.9)	385 (48.9)	549 (49.8)	0.371[1]
Insulin-dependent diabetes	77 (47.0)	172 (44.7)	249 (45.4)	
Noninsulin-dependent diabetes	87 (53.0)	213 (55.3)	300 (54.6)	
History of depression — *n* (%)	96 (30.4)	193 (24.5)	289 (26.2)	0.046[1]
Ejection fraction <45% — *n* (%)	37/312 (11.9)	90/785 (11.5)	127/1097 (11.6)	0.854[1]
Urgent status — *n* (%)	83 (26.3)	211 (26.8)	294 (26.7)	0.853[1]
Body mass index (kg/m^2) - median (Q1,Q3)†	30.30 (27, 35)	29.60 (27, 33)	29.80 (27, 34)	0.053[4]
Body surface area (m^2) - median (Q1,Q3)†	2.16 (2, 2)	2.11 (2, 2)	2.12 (2, 2)	0.003[4]
CHA2DS2-VASc score - median (Q1,Q3)†	3.0 (2, 4)	3.0 (2, 4)	3.0 (2, 4)	0.207[4]
VASQIP patient risk - median (Q1,Q3)†	0.80 (1, 1)	0.70 (0, 1)	0.70 (0, 1)	<0.001[4]
STS risk of mortality - median (Q1,Q3)†	0.79 (1, 1)	0.68 (0, 1)	0.70 (0, 1)	0.002[4]
No of grafts/pt - median (Q1,Q3)	3.0 (3, 4)	3.0 (3, 4)	3.0 (3, 4)	0.298[4]

STS = society of thoracic surgeons; VASQIP = veterans affair surgical quality improvement program.

*P-value from 1: Chi-square Test; 2: Fisher's exact test; 3: *t*-test; 4: Wilcoxon rank-sum test.

†Data was missing for the following means: CHA2DS2-VASc score for 58 patients in the POAF group and 306 patients in the no POAF group, body surface area and body mass index for 1 patient in the no POAF group, VASQIP patient risk for 2 patients in the no POAF group, and STS risk of mortality for 1 patient in the POAF group.

Table 1). There were no differences in bleeding between the two groups. The three patients with postoperative bleeding were all in the no-OAC group.

Discussion

The current investigation of veterans who underwent CABG-only surgery in the REGROUP trial found that approximately 30% developed POAF and, among these patients, approximately 30% were discharged on the oral anticoagulant warfarin. On follow-up, we found that OAC use was associated with reduced survival after separate adjustments for CHA_2DS_2-VASc and STS scores.

POAF continues to be a common complication following CABG and is associated with increased short-term morbidity and higher 1-y mortality rates.[1-7] One of the main concerns with POAF is the risk of thromboembolism and stroke. In a prior analysis of our study population, we did not observe a significant difference in the stroke rate when we compared patients who developed POAF *versus* those who did not[17]; however, an administrative data analysis of 109,000 cardiac surgery patients with POAF showed a significant association between POAF and early postoperative stroke (HR 1.5; 95% CI, 1.3-1.6). This risk did decrease after hospital discharge (HR, 1.1; 95% CI, 1.0-1.2).[18] As well, a meta-analysis, by Lin et al.,[19] of 35 cohort studies examining post-CABG POAF found a significantly higher risk of stroke among patients who developed POAF compared to those who did not (OR 1.62; 95% CI, 1.47-1.80).

Due to concerns about increased thromboembolic risk, patients who develop POAF have traditionally been treated according to the guidelines for the general population with AF,[12] which are based on the CHA_2DS_2-VASc score. Often, they have been anticoagulated with warfarin, although warfarin has increasingly been replaced with non-vitamin K Antagonist Direct Oral Anticoagulants .However, these recommendations do not account for the potentially higher risk of major bleeding that may occur with anticoagulation in the post-CABG population.[20] Consistent with a lack of prospective data on the efficacy of OAC for patients who develop POAF,[13,14] societal guidelines on the need for POAF anticoagulation are ambivalent. According to American and European guidelines, initiation of OAC for POAF is a Class IIa recommendation,

Table 2 – Baseline patient characteristics comparing POAF patients who received warfarin *versus* no warfarin.

Demographics	OAC ($n = 85$)	No OAC ($n = 184$)	Total ($n = 269$)	*P*-value*
Age in years - median (Q1, Q3)	69.2 (66, 72)	67.9 (64, 72)	68.2 (64, 72)	0.420[4]
White (*versus* all other) – *n* (%)	75 (88.2)	167 (90.8)	242 (90.0)	0.522[1]
Smoking last use – *n* (%)				0.918[2]
Never smoked	21 (24.7)	44 (23.9)	65 (24.2)	
<3 mo prior to surgery	18 (21.2)	43 (23.4)	61 (22.7)	
≥3 mo but <1 y prior to surgery	1 (1.2)	1 (0.5)	2 (0.7)	
≥1 y prior to surgery	45 (52.9)	95 (51.6)	140 (52.0)	
Missing	0 (0.0)	1 (0.5)	1 (0.4)	
Chronic lung disease – *n* (%)	18 (21.2)	33 (17.9)	51 (19.0)	0.528[1]
Serum creatinine ≥1.5 mg/dL – *n* (%)	8/77 (10.4)	16/161 (9.9)	24/238 (10.1)	0.914[1]
Cerebrovascular accident (CVA) – *n* (%)	6 (7.1)	14 (7.6)	20 (7.4)	0.873[1]
Peripheral vascular disease – *n* (%)	9 (10.6)	27 (14.7)	36 (13.4)	0.360[1]
Hypertension – *n* (%)	79 (92.9)	162 (88.0)	241 (89.6)	0.221[1]
Diabetes – *n* (%)	39 (45.9)	96 (52.2)	135 (50.2)	0.337[1]
Insulin-dependent diabetes	23 (59.0)	39 (40.6)	62 (45.9)	
Noninsulin-dependent diabetes	16 (41.0)	57 (59.4)	73 (54.1)	
History of depression – *n* (%)	19 (22.4)	60 (32.6)	79 (29.4)	0.086[1]
Ejection fraction <45%– *n* (%)	15 (17.6)	18/180 (10.0)	33/265 (12.5)	0.078[1]
Urgent status– *n* (%)	22 (25.9)	41 (22.3)	63 (23.4)	0.517[1]
Body mass index (kg/m^2) - mean ± SD	30.82 ± 4.626	30.72 ± 5.481	30.75 ± 5.218	0.885[3]
Body surface area (m^2) - median (Q1,Q3)	2.17 (2, 2)	2.13 (2, 2)	2.15 (2, 2)	0.293[4]
CHA2DS2-VASc score - median (Q1,Q3)†	3.0 (2, 4)	3.0 (2, 4)	3.0 (2, 4)	0.437[4]
VASQIP patient risk - median (Q1,Q3)	0.80 (1, 1)	0.80 (0, 1)	0.80 (0, 1)	0.394[4]
STS risk of mortality - median (Q1,Q3)†	0.76 (1, 1)	0.77 (0, 1)	0.77 (0, 1)	0.516[4]
No of grafts/pt - median (Q1,Q3)	3.0 (3, 4)	3.0 (3, 3)	3.0 (3, 3)	0.239[4]

*P-value from 1: Chi-square test; 2: Fisher's exact test; 3: *t*-test; 4: Wilcoxon rank-sum test.
† Data was missing for the following means: CHA2DS2-VASc score for 14 patients in the warfarin group and 43 patients in the no warfarin group, and STS Risk of Mortality for 1 patient in the warfarin group.

suggesting possible benefit over risk and that OAC use is reasonable. Similarly, the Canadian guidelines only suggest using OAC.[21]

Indeed, the literature for OAC use in patients with post-CABG POAF is inconclusive. In a large cohort of CABG patients with POAF (2738 patients), Crystal et al.[22] did not find that the 638 patients who received OAC benefited over those who did not. Another large Danish National Patient Registry study by Butt et al.,[23] compared patients with post-CABG POAF, to patients with nonsurgical, nonvalvular atrial fibrillation (NVAF). Based on age, gender, CHA_2DS_2-VASc score, and year of diagnosis, 2108 POAF patients were matched in a 1:4 ratio with 8432 NVAF. The investigators found that patients with POAF had a significantly lower risk of thromboembolism compared to patients with nonsurgical, NVAF (adjusted HR, 0.67; 95% CI, 0.55-0.81, $P < 0.001$). In this investigation, 42.9% of NVAF patients received OAC *versus* 8.4% POAF patients. Among NVAF patients, OAC was associated with a significantly lower mortality risk ($P < 0.001$). In contrast, among POAF patients, no survival benefit was seen

Table 3 – Amiodarone use and discharge rhythm status* comparing patients discharged with OAC *versus* no OAC*.

Status at discharge	OAC		No OAC	
	Amiodarone	No amiodarone	Amiodarone	No amiodarone
	N (%)	*N* (%)	*N* (%)	*N* (%)
Sinus rhythm	42 (79.2)	11 (20.8)	100 (75.2)	33 (24.8)
Afib/Aflutter	10 (62.5)	6 (37.5)	3 (75.0)	1 (25.0)
Total	52 (75.4)	17 (24.6)	103 (75.2)	34 (24.8)

OAC group based on Warfarin use during discharge through 6 mo post-op.
*Discharge rhythm status missing for 63 patients.

Table 4 – Association of OAC (warfarin) with clinical outcomes during active and passive follow-up, unadjusted and with adjustment for CHA_2DS_2-VASc score and STS scores.

Active Follow-up	OAC ($n = 85$) n (%)	No OAC ($n = 184$) n (%)	P-value	Unadjusted HR	95% CI	P-value	Adjusted HR for CHA_2DS_2-VASc score	95% CI	P-value	Adjusted HR for STS risk of mortality	95% CI	P-value
Death from any cause	12 (14.1)	10 (5.4)	0.016	2.712	1.171-6.280	0.020	5.630	1.789-17.72	0.003	2.886	1.241-6.712	0.014
Cardiac-related death	6 (7.1)	2 (1.1)	0.014	6.865	1.385-34.03	0.018	10.565	1.232-90.57	0.032	7.829	1.540-39.80	0.013
MACE	17 (20.0)	21 (11.4)	0.060	1.917	1.011-3.634	0.046	2.523	1.162-5.477	0.019	1.966	1.037-3.728	0.038
AMI	6 (7.1)	4 (2.2)	0.077	3.540	0.998-12.55	0.050	3.124	0.691-14.12	0.139	3.611	1.018-12.81	0.047
Repeat revascularization	7 (8.2)	11 (6.0)	0.491	1.506	0.584-3.886	0.397	1.563	0.493-4.954	0.448	1.531	0.593-3.951	0.378
Stroke	3 (3.5)	10 (5.4)	0.761	0.645	0.177-2.343	0.505	0.608	0.125-2.961	0.538	0.656	0.180-2.384	0.521
Active + passive follow-up	OAC ($n = 85$) n (%)	No OAC ($n = 184$) n (%)	P-value	Unadjusted HR	95% CI	P-value	Adjusted HR for CHA_2DS_2-VASc score	95% CI	P-value	Adjusted HR for STS risk of mortality	95% CI	P-value
Death from any cause	17 (20.0)	21 (11.4)	0.060	1.871	0.987-3.548	0.055	2.302	1.080-4.907	0.031	1.999	1.049-3.809	0.035
MACE	25 (29.4)	38 (20.7)	0.115	1.570	0.947-2.602	0.080	1.474	0.821-2.645	0.193	1.604	0.968-2.659	0.067
AMI	9 (10.6)	9 (4.9)	0.082	2.449	0.971-6.174	0.058	1.987	0.664-5.943	0.219	2.523	1.000-6.366	0.050
Repeat revascularization	8 (9.4)	17 (9.2)	0.964	1.117	0.482-2.588	0.797	0.987	0.374-2.603	0.979	1.145	0.494-2.656	0.752

Warfarin group based on Warfarin use during discharge through 6 mo post-op.
MACE = major adverse cardiac event; STS = society of thoracic surgeons; AMI = acute myocardial infarction; OAC = oral anticoagulation; HR = hazard ratio.

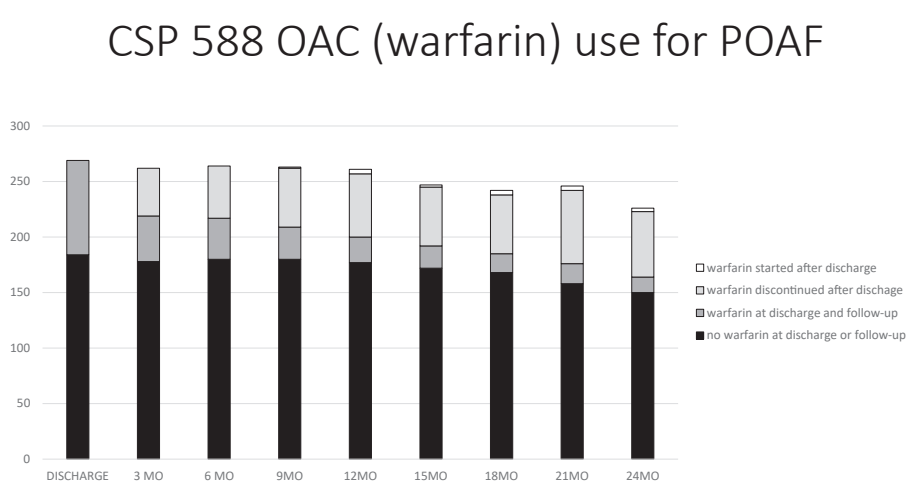

Fig. 2 – Trends in OAC (warfarin). Time trend of Cooperative Studies Program #588 (REGROUP) patients who continued OAC, were started on OAC, discontinued OAC, or remained off OAC use over the ensuing 24 mo after discharge.

for patients taking OAC ($P = 0.56$). The thromboembolic risk for POAF patients, compared to patients without POAF, was comparable (adjusted HR, 1.11; 95% CI, 0.94-1.32, $P < 0.24$). Last, a recent analysis, using linked STS and Medicare Databases, of 38,936 patients who developed POAF after CABG, showed that anticoagulation, administered to 25% ($n = 9861$) of the cohort, was associated with higher mortality (HR 1.16, 95% CI 1.06-1.26) and bleeding risk (1.6, 95% CI 1.38-1.85). There was no difference in stroke risk with anticoagulation (HR 0.97; 95% CI 0.82-1.15). Subgroup analyses of patients at potentially higher risk of stroke, including those patients with a CHA_2DS_2VAsc risk score of 2-4 and those with a score 5 or greater also did not show reduced stroke risk with anticoagulation.[24]

While the reasons for worse outcomes in the OAC subgroup population in our study are not clear, one notable finding was the higher rate of serious adverse events that occurred in this subgroup relative to those who were not discharged with OAC. Most of these were cardiac-related, which may have contributed to reduced survival. As well, more patients in the OAC group had pneumonia and cholecystitis. There were no differences in bleeding or neurologic complications. As such, although the adverse event rate was higher in the OAC group, it does not appear that these events were related to the use of anticoagulation.

Limitations

Limitations to this dataset should be noted,mainly as regards missing data. A number of patients were excluded from the analysis because they were taking anticoagulation preoperatively without a documented indication. Because survival adjusted for CHA_2DS_2-VASc scores might have been affected by missing data in these two subgroups, adjustment for STS scores was also carried out to determine if the association of OAC with reduced long-term survival was robust. It should also be noted that the discharge rhythm was missing for 16 (19%) patients in the OAC subgroup and 48 patients (24%) in the no OAC subgroup, as this field was added to a later version of the data collection forms after study enrollment had begun. While these missing data may have impacted the results examining the association of amiodarone with discharge rhythm, we believe its influence on survival was less likely given the difference in missing data between OAC and non-OAC groups is relatively low at 5%. Other limitations include the small number of patients in the two comparative groups, limited information on the decision-making process for giving anticoagulation in POAF patients and the fact that data collected on oral anticoagulants only warfarin was specifically named—especially as direct oral anticoagulants, which are increasingly becoming the antithrombotic of choice. As well, patients were compared according to their discharge OAC use, which was noted to evolve during the ensuing follow-up months. Patients were predominantly male veterans; therefore, the results are not generalizable. Strengths of our study include prospective collection of the data on POAF as part of a preapproved substudy of a randomized trial, included granularity on antiarrhythmic therapies, and detailed follow-up by dedicated research nurses at each of the participating centers.

Conclusions

In the REGROUP trial, OAC use among patients with new-onset POAF was associated with a higher risk of mortality when compared to POAF patients who were not anticoagulated. Stroke was not statistically different between groups. Based on these findings and recent retrospective studies in the literature, the risk-benefit ratio of OAC use to reduce the risk of thromboembolism in patients with POAF may need closer examination and be tailored according to individual patient circumstances. Larger-scale prospective trials may be helpful in further elucidating the risk-benefit ratio of anticoagulation for post-CABG patients whose sole indication is POAF.

Supplementary Materials

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jss.2023.10.016.

Author Contributions

Almassi contributed to design, data capture, data coding/analysis, data report interpretation, writing first draft, revising first draft, finalizing draft, and approved submission. Quin contributed to data analysis, writing first draft, revising first draft, finalizing draft, and visual abstract approved submission. Stock contributed to data cleaning, data coding/analysis, data report interpretation, revising first draft, finalizing draft, and approved submission. DeMatt contributed to data cleaning, data coding/analysis, data report interpretation, revising first draft, finalizing draft, and approved submission. Biswas contributed to data coding/analysis, data report interpretation, and approved submission. Hattler contributed to data analysis, writing first draft, revising first draft, finalizing draft, and approved submission. Tseng contributed to data analysis, revising first draft, finalizing draft, and approve submission. Zenati contributed to data capture, data coding/analysis, data report interpretation, revising first draft, finalizing draft, and approved submission.

Disclosure

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