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CLINICAL INVESTIGATIONS

Outcome of octogenarians with atrial fibrillation undergoing percutaneous coronary intervention: insights from the AFCAS registry

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Background: More evidence is needed on the optimal antithrombotic regimen in elderly patients with atrial fibrillation (AF) undergoing percutaneous coronary intervention (PCI).

Hypothesis: Octogenarian patients (aged ≥ 80 years) with AF who underwent PCI have worse 12-month clinical outcome, compared with younger patients.

Methods: We performed a post-hoc analysis of data from the prospective, multicenter AFCAS registry, which enrolled consecutive patients with AF who underwent PCI and stenting. Outcome measures included major adverse cardiac/cerebrovascular events (MACCE; all-cause death, myocardial infarction, repeat revascularization, stent thrombosis, or stroke/transient ischemic attack) and bleeding events at 12-month follow-up.

Results: Out of 925 AF patients enrolled in AFCAS registry, 195 (21.1%) were ≥ 80 years. Mean age was 82.9 ± 2.6 years; 41.5% were women; 32.3% had diabetes mellitus. Compared with patients aged < 80 years, there were more females among the octogenarians ($P < 0.001$). Compared with younger patients, octogenarians smoked and had dyslipidemia less often, and presented more frequently with acute coronary syndrome. The frequency and duration of antithrombotic regimens prescribed at discharge were comparable. At 12-month follow-up, overall MACCE rate was higher in octogenarians compared with younger patients (27.7% vs 20.1%, $P = 0.02$). The rate of acute myocardial infarction was higher in octogenarians (9.2% vs 4.9%, $P = 0.02$), but the rates of all bleeds and BARC > 2 bleeds were similar ($P = 0.13$, $P = 0.29$, respectively).

Conclusions: In real-world patients with AF undergoing PCI, patients aged ≥ 80 years had higher incidence of MACCE at 12-month follow-up compared with younger patients, although they received comparable antithrombotic treatment. The rates of bleeding events were similar.

KEYWORDS

Atrial Fibrillation, Octogenarians, Oral Anticoagulation, Percutaneous Coronary Intervention

1 | INTRODUCTION

Life expectancy has increased in the Western world, and more octogenarian patients (aged ≥ 80 years) now undergo percutaneous coronary intervention (PCI) with stent implantation. Octogenarians have a high-risk clinical profile and more complex coronary disease compared with

younger patients.¹ Expectedly, older age is associated with worse short-term and long-term clinical outcomes following PCI.^{2,3} Yet limited evidence is available on the efficacy and safety of PCI in both elderly and female patients, because they are underrepresented in clinical trials.⁴

Prevalence of atrial fibrillation (AF) increases with age.⁵ Nearly 5% of patients undergoing PCI and stenting have an indication for

long-term oral anticoagulation (OAC) due to AF.⁶ The current management guidelines recommend triple therapy (dual antiplatelet therapy [DAPT] on top of OAC), at least for a short period after PCI.⁷ However, the optimal antithrombotic regimen in this particularly high-risk group of older patients remains unclear, and there is a need for more data on antithrombotic treatment and outcomes of octogenarian patients with AF undergoing PCI.

We performed a post-hoc analysis of data from the prospective Atrial Fibrillation Undergoing Coronary Artery Stenting (AFCAS) Registry to explore the 12-month clinical outcome of patients aged ≥ 80 years undergoing PCI in comparison with younger patients, with gender-based analysis of outcome.

2 | METHODS

2.1 | Patient selection and study design

The AFCAS Registry is a prospective, multicenter, observational study that enrolled consecutive patients with AF undergoing PCI and stenting.⁸ The inclusion criterion was ongoing AF or a history of AF (paroxysmal, persistent, or permanent). The only exclusion criterion was unwillingness or inability to participate in the study or to give informed consent. In each participating center, PCI was performed according to local practice, and follow-up time was 12 months. Periprocedural and postprocedural antithrombotic regimens were at the operators' discretion. Follow-up was performed by phone calls or clinical controls at 1, 3, 6, and 12 months after PCI. Patients were asked about clinical outcome endpoints (described below), hospitalization, and medications. CHA₂DS₂-VASC and HAS-BLED scores were calculated before PCI to evaluate the individual risks for stroke and bleeding events, respectively.

This investigator-driven study was conducted according to the guidelines of the 1964 Declaration of Helsinki as revised in 2013. The study protocol was approved by the ethics committees of the participating centers. Informed written consent was obtained from every patient after full explanation of the study protocol. The AFCAS Registry is registered under <http://www.ClinicalTrials.gov> at NCT00596570.

2.2 | Study definitions and endpoints

The primary outcome measures were (1) major adverse cardiac/cerebrovascular events (MACCE) and (2) bleeding events. The composite endpoint of MACCE was defined as the first occurrence of all-cause death, myocardial infarction (MI), repeat revascularization, stent thrombosis (ST), or stroke/transient ischemic attack. MI was defined according to the Third Universal Definition.⁹ Repeat revascularization was defined as PCI or coronary bypass surgery to treat significant stenosis ($>50\%$) in the previously treated vessel. ST was adjudicated according to the criteria of definite or probable ST described by the Academic Research Consortium (ARC).¹⁰ TIA was defined as a transient (<24 hours) focal neurological deficit adjudicated by a neurologist, whereas stroke was defined as a permanent focal neurological deficit confirmed by computed tomography or magnetic resonance

imaging and adjudicated by a neurologist. Bleeding events were defined according to the BARC criteria and included events adjudicated as minor (BARC 2) and major (BARC 3a, 3b, 3c, and 5).¹¹

2.3 | Statistical analysis

Continuous variables were reported as the mean \pm SD or median (interquartile range [IQR]). Categorical variables were described with absolute and relative (percentage) frequencies. Comparisons were performed using the unpaired 2-tailed *t* test for continuous variables and the Pearson χ^2 test or Fisher exact test for categorical variables, as appropriate. Kaplan-Meier estimates of MACCE and all bleeding events were used to construct time-to-event curves. These estimates were based on all the available data for MACCE and all bleeding events, with follow-up data censored at the time of first event or latest known follow-up. All tests were 2-sided, and statistical significance was set at 5%. Statistical analysis was performed using SPSS software, version 20 (IBM Corp., Armonk, NY).

3 | RESULTS

3.1 | Baseline clinical and procedural data

Out of 925 AF patients enrolled in the AFCAS registry, a total of 195 (21.1%) patients were ≥ 80 years: 189 (96.9%) were octogenarians and 6 (3.1%) nonagenarians (aged ≥ 90 years). Their mean age was 82.9 ± 2.6 years (median, 82; range, 80–92 years). Eighty-one patients (41.5%) were females, and 63 (32.3%) had diabetes mellitus. Mean CHA₂DS₂-VASC score was 5.1 ± 1.2 (median [IQR] 5 [2]) and mean HAS-BLED score was 3.1 ± 0.7 (median [IQR] 3 [0]).

The octogenarians were more often females. They smoked and had dyslipidemia less often in comparison with younger patients, and their body mass index and glomerular filtration rate were lower ($P < 0.01$ for all). Patients aged ≥ 80 years had a higher risk of thromboembolism and bleeding ($P < 0.001$ both). The 2 groups were comparable regarding prior coronary and cerebrovascular events, prior bleeding events, as well as prior heart failure and mean left ventricular ejection fraction ($P > 0.05$ for all). These findings were almost consistent in both gender subgroups (Table 1).

Compared with younger patients, the patients aged ≥ 80 years presented more often with acute coronary syndrome (ACS). This was consistent in males ($P < 0.001$), but not in females ($P = 0.23$). There was no significant difference in the use of drug-eluting stents or other periprocedural data between the 2 groups (Table 2).

3.2 | Antithrombotic regimens

Among patients aged ≥ 80 years, triple therapy (OAC + clopidogrel + aspirin) was the most common antithrombotic regimen prescribed at discharge (70.3%), followed by DAPT (clopidogrel + aspirin; 19.5%). The mean duration of clopidogrel use was 5.7 ± 4.8 months. The frequency of antithrombotic regimens prescribed at discharge was comparable between octogenarians and younger patients (Table 3). The proportions of patients on clopidogrel were comparable between patients aged ≥ 80 years and younger patients at 3, 6, 9, and

TABLE 1 Baseline characteristics

Variable	Whole Cohort, N = 925			Males, n = 650			Females, n = 275		
	OG, n = 195	Younger, n = 730	P Value	OG, n = 114	Younger, n = 536	P Value	OG, n = 81	Younger, n = 194	P Value
Age, y, mean \pm SD	82.9 \pm 2.6	70.4 \pm 6.7	<0.001	83.0 \pm 2.8	69.7 \pm 7.1	<0.001	82.9 \pm 2.4	72.3 \pm 5.3	<0.001
Age, y, median (IQR)	82 (3)	72 (8)		82 (4)	71 (9)		83 (3)	74 (6)	
Female sex	81 (41.5)	194 (26.6)	<0.001						
BMI	26.2 \pm 3.5	28.8 \pm 4.7	<0.001	26.2 \pm 23.2	28.7 \pm 4.5	<0.001	26.2 \pm 3.9	29.1 \pm 5.1	<0.001
Preprocedural GFR (ml/min/1.73m ²)	53 \pm 19	80 \pm 35	<0.001	55.3 \pm 19.4	84.1 \pm 35.9	<0.001	49.5 \pm 18.5	69.3 \pm 28.0	<0.001
LVEF, %	49 \pm 14	50 \pm 14	0.41	48.4 \pm 14.8	48.5 \pm 14.0	0.95	49.2 \pm 11.9	53.3 \pm 13.6	0.041
DM	63 (32.3)	274 (37.5)	0.18	36 (31.6)	189 (35.3)	0.45	27 (33.3)	85 (43.8)	0.11
HTN	160 (82.1)	616 (84.4)	0.43	88 (77.2)	447 (83.4)	0.12	72 (88.9)	169 (87.1)	0.68
Dyslipidemia	114 (58.5)	502 (68.8)	0.007	62 (54.4)	361 (67.4)	0.008	52 (64.2)	141 (72.7)	0.16
Smoking	9 (4.6)	83 (11.4)%	0.005	7 (6.1)	73 (13.6)	0.027	2 (2.5)	10 (5.2)	0.32
Prior MI	57 (29.2)	179 (24.5)	0.18	35 (30.7)	140 (26.1)	0.32	22 (27.2)	39 (20.1)	0.20
Prior PCI	25 (12.8)	135 (18.5)	0.063	16 (14.0)	99 (18.5)	0.26	9 (11.1)	36 (18.6)	0.13
Prior CABG	21 (10.8)	113 (15.5)	0.097	19 (16.7)	97 (18.1)	0.72	2 (2.5)	16 (8.2)	0.08
Prior HF	43 (22.1)	142 (19.5)	0.42	29 (25.4)	110 (20.5)	0.25	14 (17.3)	32 (16.5)	0.87
Prior stroke	26 (13.3)	85 (11.6)	0.52	16 (14.0)	64 (11.9)	0.54	10 (12.3)	21 (10.9)	0.72
Prior TIA	9 (4.6)	37 (5.1)	0.80	4 (3.5)	30 (5.6)	0.36	5 (6.2)	7 (3.6)	0.34
Prior hemorrhage	9 (4.6)	29 (4.0)	0.70	6 (5.3)	22 (4.1)	0.59	3 (3.7)	7 (3.6)	0.98
CHA ₂ DS ₂ -VAsC score	5.1 \pm 1.2	4.2 \pm 1.5	<0.001	4.7 \pm 1.1	3.8 \pm 1.4	<0.001	5.8 \pm 1.1	5.1 \pm 1.3	<0.001
CHA ₂ DS ₂ -VAsC \geq 2	195 (100)	716 (98.1)	<0.001	114 (100)	522 (97.4)	0.081	81 (100)	194 (100)	1.0
HAS-BLED score	3.1 \pm 0.7	2.9 \pm 0.7	<0.001	3.1 \pm 0.8	2.9 \pm 0.8	0.007	3.2 \pm 0.6	3.0 \pm 0.7	0.030
HAS-BLED \geq 3	167 (85.6)	540 (74.0)	0.001	92 (80.7)	384 (71.6)	0.047	75 (92.6)	156 (80.4)	0.012

Abbreviations: BMI, body mass index; CABG, coronary artery bypass grafting; CHA₂DS₂-VAsC, congestive HF, HTN, age > 75 y, DM, stroke/TIA, vascular disease, age 65–74 y, sex category (female); DM, diabetes mellitus; GFR, glomerular filtration rate; HAS-BLED, HTN, abnormal renal and liver function, stroke, bleeding history or predisposition, labile INR, elderly age > 65 years; HF, heart failure; HTN, hypertension; INR, international normalized ratio; IQR, interquartile range; LVEF, left ventricular ejection fraction; MI, myocardial infarction; OG, octogenarians; PCI, percutaneous coronary intervention; OG, standard deviation; TIA, transient ischemic attack. Categorical variables are presented as n (%) and continuous variables as mean \pm SD or median (IQR).

TABLE 2 Procedural data

Variable	Whole Cohort, N = 925			Males, n = 650			Females, n = 275		
	OG, n = 195	Younger, n = 730	P Value	OG, n = 114	Younger, n = 536	P Value	OG, n = 81	Younger, n = 194	P Value
Presentation by ACS	135 (69.6)	392 (53.7)	<0.001	81 (71.1)	276 (51.5)	<0.001	54 (67.5)	116 (59.8)	0.23
STEMI	32 (16.5)	93 (12.7)	0.18	17 (14.9)	68 (12.7)	0.52	15 (18.5)	25 (12.9)	0.23
Lesions per patient	1.2 ± 0.4	1.2 ± 0.4	0.64	1.2 ± 0.5	1.2 ± 0.4	0.15	1.1 ± 0.3	1.2 ± 0.4	0.30
DES	38 (20.3)	181 (25.8)	0.12	20 (17.9)	138 (26.3)	0.061	18 (22.8)	44 (23.0)	0.96
Total stent length (mm)	24.6 ± 16.8	25.0 ± 16.3	0.75	26.4 ± 19.1	25.1 ± 16.9	0.47	22.2 ± 12.7	25.0 ± 14.3	0.13
Procedural success	190 (97.4)	707 (96.8)	0.67	110 (96.5)	515 (96.1)	0.84	80 (98.8)	192 (99.0)	0.88
Radial access	57 (29.2)	201 (27.5)	0.64	39 (34.2)	149 (27.8)	0.17	18 (22.2)	52 (26.8)	0.43
Hospital stay (days)									
Mean ± SD	5.9 ± 7.8	4.8 ± 7.5	0.050	5.4 ± 6.9	5.0 ± 8.2	0.61	6.7 ± 8.9	4.0 ± 4.6	0.001
Median (IQR)	4 (5)	2 (5)		3 (5)	2 (5)		4 (6)	2 (5)	
TTR (%)	68 ± 34	68 ± 34	0.87	71 ± 33	68 ± 32	0.38	64 ± 34	68 ± 33	0.46

Abbreviations: ACS, acute coronary syndrome; DES, drug-eluting stents; IQR, interquartile range; OG, octogenarians; PCI, percutaneous coronary intervention; SD, standard deviation; STEMI, ST-segment elevation myocardial infarction; TTR, time in therapeutic range. Categorical variables are presented as n (%) and continuous variables as mean ± SD or median (IQR).

12 months (61.8% vs 64.9%, 45.3% vs 44.7%, 35.3% vs 33.7%, and 33.5% vs 30.4%, respectively); similarly, the proportions of patients on aspirin were comparable (75.4% vs 77.3%, 67.7% vs 70.1%, 64.1% vs 64.9%, and 60.0% vs 61.4%, respectively).

3.3 | Short-term and long-term outcome

Adverse outcome events are summarized in Table 4. The cumulative incidence of MACCE in patients aged ≥80 years was comparable during hospital stay and at 30 days, but significantly higher at 12 months ($P = 0.02$), in comparison with younger patients. There was a similar trend in both gender subgroups ($P = 0.09$ both). This was mainly driven by a higher incidence of MI shortly after index PCI and at 12 months. A trend to higher all-cause mortality rate was evident at 12-month follow-up only. Despite a higher incidence of MI, the rate of repeat revascularization was not different between octogenarians and younger patients. The cumulative rates of BARC >2 bleeds were 12.3% vs 9.7% ($P = 0.29$) in patients ≥80 years compared with younger patients, respectively, and this was consistent in both gender subgroups.

4 | DISCUSSION

The AFCAS Registry shows that octogenarians have a higher incidence of MACCE at 12 months despite comparable antithrombotic regimens, mainly driven by higher incidence of MI. On the other hand, the bleeding rates were not significantly different between octogenarians and younger patients.

Few data exist on the optimal antithrombotic regimen in older patients with AF who need lifelong OAC and undergo PCI. In the randomized trials What Is the Optimal Antiplatelet and Anticoagulant Therapy in Patients With Oral Anticoagulation and Coronary Stenting (WOEST), A Study Exploring Two Strategies of Rivaroxaban and One of Oral Vitamin K Antagonist in Patients With Atrial Fibrillation Who Undergo Percutaneous Coronary Intervention (PIONEER AF-PCI), and Evaluation of Dual Therapy With Dabigatran vs Triple Therapy With Warfarin in Patients With AF That Undergo a PCI With Stenting (REDUAL-PCI), the proportion of patients aged ≥80 years was not separately reported.^{12–14} In the WOEST and PIONEER AF-PCI trials, a regimen of dual therapy with OAC (vitamin K antagonist and rivaroxaban, respectively) plus a P2Y12 inhibitor was associated with lower rates of clinically significant bleeding compared with triple therapy (OAC + P2Y12 inhibitor + aspirin).^{12,13} In the recently reported REDUAL-PCI trial, dual therapy with OAC (dabigatran 110 mg twice daily) plus P2Y12 inhibitor was associated with lower rates of clinically relevant bleeding compared with warfarin triple therapy (warfarin + P2Y12 inhibitor + aspirin for 1–3 months).¹⁴ In all 3 trials, the rates of thromboembolic events were not significantly different between the 2 comparison groups; however, the 3 trials were underpowered to examine thromboembolic events (composite efficacy endpoint).^{12–14} Moreover, in the WOEST trial (69% of patients had AF), reduction of bleeding was driven by reduction of minor, rather than major, bleeding events¹²; the PIONEER AF-PCI trial excluded patients with prior stroke or transient ischemic attack and those with new-onset AF¹³; and REDUAL-PCI trial excluded those with severe

TABLE 3 Antithrombotic and cardiac medications

Variable	Whole Cohort, N = 925			Males, n = 650		Females, n = 275	
	OG, n = 195	Younger, n = 730	P Value	OG, n = 114	Younger, n = 536	OG, n = 81	Younger, n = 194
							P Value
Periprocedural INR	1.9 ± 0.6	1.9 ± 0.7	0.98				
GPI	41 (21.0)	139 (19.0)	0.53	25 (21.9)	107 (20.0)	16 (19.8)	32 (16.5)
VKA + Clop + ASA	137 (70.3)	541 (74.1)	0.28	80 (70.2)	401 (74.8)	57 (70.4)	140 (72.2)
VKA + Clop/ASA	20 (10.3)	66 (9.0)	0.60	14 (12.3)	51 (9.5)	6 (7.4)	15 (7.7)
Clop + ASA	38 (19.5)	123 (16.8)	0.39	20 (17.5)	84 (15.7)	18 (22.2)	39 (20.1)
Clop duration (months)	5.7 ± 4.8	5.7 ± 4.7	1.0	5.7 ± 4.7	5.7 ± 4.7	5.8 ± 5.0	5.8 ± 4.7
Median (IQR) (months)	3 (11)	3 (11)		3 (11)	3 (11)	3 (11)	3 (11)
β-Blockers	163 (83.6)	640 (87.7)	0.19	98 (86.0)	468 (87.3)	65 (80.2)	172 (88.7)
Lipid-lowering agents	154 (79.0)	637 (87.3)	0.013	89 (78.1)	465 (86.8)	65 (80.2)	172 (88.7)
ACEIs/ARBs	158 (84.9)	573 (80.5)	0.16	89 (81.7)	419 (80.1)	69 (89.6)	154 (81.5)

Abbreviations: ACEI, angiotensin-converting enzyme inhibitors; ARB, angiotensin receptor blockers; ASA, acetylsalicylic acid (aspirin); Clop, clopidogrel; GPI, glycoprotein IIb/IIIa inhibitors; INR, international normalized ratio; IQR, interquartile range; OG, octogenarians; SD, standard deviation; VKA, vitamin K antagonists. Categorical variables are presented as n (%) and continuous variables as mean ± SD or median (IQR).

renal impairment.¹⁴ In the current registry, the prescribed antithrombotic regimens (medications, dosage, and duration) were widely heterogeneous because they were based on local practice and operators' discretion.

Unanswered questions include the duration of each antithrombotic medication and the change of antithrombotic regimen over time. Our findings provide important clinical data in this setting. In real-life practice, the duration of intensified antithrombotic therapy after PCI is often shortened in elderly patients because of a presumed higher bleeding risk. As expected, octogenarians in our cohort had a higher HAS-BLED score. The higher bleeding risk did not, however, lead to a less intensive antithrombotic treatment in octogenarians; and, surprisingly, both the total and clinically significant bleeding event rates did not differ between the age groups. The comparable 12-month bleeding rates, despite a higher bleeding risk in octogenarians, might be viewed in light of the similar periprocedural international normalized ratio, similar time in therapeutic range throughout the follow-up period, and similar duration of clopidogrel usage in the 2 age groups. Comparably, in an unselected cohort of patients with AF undergoing PCI, octogenarians (higher bleeding and thrombotic risk scores) experienced more MACCE (mainly driven by higher rates of all-cause death and embolism), higher major bleeding rates, and similar minor bleeding rates, compared with younger patients.¹⁵ In that cohort, OAC prescribed at discharge for octogenarian patients was associated with lower rates of MACCE.¹⁵ Notably, octogenarian women—often considered as “extra-frail” patients—had bleeding rates comparable with octogenarian men, and with younger women. Given the higher rates of thrombotic events and the comparable rates of bleeding events in octogenarians, and the largely comparable distribution of prescribed antithrombotic medications between the 2 age groups, our study supports the view that longer antithrombotic treatment might be considered in octogenarians, especially in those presenting with ACS. This assumption, however, needs to be confirmed in adequately powered randomized trials.

In accordance with a previous study,¹⁶ octogenarians in the AFCAS registry presented more often with ACS compared with younger patients. In the same prior study, octogenarians (65.5% drug-eluting stents vs 80.1% in younger patients) had higher rates of mortality, ST, and clinically driven in-stent restenosis at 12-month follow-up, compared with younger patients.¹⁶ This may partly explain the higher incidence of MI events, and consequently the higher incidence of MACCE, at 12-month follow-up in octogenarians in our cohort. In the AFCAS study, older patients were not treated more frequently with bare-metal stents, as is often recommended to enable shorter DAPT (Table 2). Octogenarians treated with PCI have more comorbidities compared with younger patients,^{16,17} and this may affect noncardiac causes of mortality as well. Yet in a cohort of octogenarians who underwent PCI for ACS, cardiovascular death was responsible for 71% of all-cause mortality at 5-year follow-up.¹⁸

Increasing age is a well-known risk factor for mortality after PCI. Not surprisingly, the proportion of patients aged ≥80 years (21.1%) in the AFCAS registry was higher than recent reports from unselected patients (12%)¹⁹ and from patients who underwent primary PCI for ST-segment elevation MI (10.3% and 11.6%).^{20,21} This is comprehensible because the prevalence of AF increases progressively with age.

TABLE 4 Clinical outcome at 12-month follow-up

Variable	Whole Cohort, N = 925			Males, n = 650			Females, n = 275		
	OG, n = 195	Younger, n = 730	P Value	OG, n = 114	Younger, n = 536	P Value	OG, n = 81	Younger, n = 194	P Value
MACCE									
12 months	54 (27.7)	147 (20.1)	0.023	32 (28.1)	112 (20.9)	0.09	22 (27.2)	35 (18.0)	0.09
30 days	14 (7.2)	51 (7.0)	0.93	9 (7.9)	36 (6.7)	0.65	5 (6.2)	15 (7.7)	0.65
In-hospital	7 (3.6)	31 (4.3)	0.67	4 (3.5)	24 (4.5)	0.64	3 (3.7)	7 (3.7)	0.99
Death									
12 months	29 (14.9)	74 (10.1)	0.06	18 (15.8)	56 (10.4)	0.10	11 (13.6)	18 (9.3)	0.29
30 days	6 (3.1)	26 (3.6)	0.74	4 (3.5)	17 (3.2)	0.85	2 (2.5)	9 (4.6)	0.40
In-hospital	5 (2.6)	14 (1.9)	0.58	2 (1.8)	10 (1.9)	0.93	3 (3.7)	4 (2.1)	0.44
MI									
12 months	18 (9.2)	36 (4.9)	0.023	11 (9.6)	23 (4.3)	0.020	7 (8.6)	13 (6.7)	0.57
In-hospital	6 (3.4)	9 (1.3)	0.062	3 (2.9)	6 (1.2)	0.20	3 (4.0)	3 (1.6)	0.25
Re-vascularization	59 (8.1)	14 (7.2)	0.68	8 (7.0)	43 (8.0)	0.72	6 (7.4)	16 (8.2)	0.82
ST									
12 months	5 (2.6)	10 (1.4)	0.24	3 (2.6)	7 (1.3)	0.30	2 (2.5)	3 (1.5)	0.60
Stroke/TIA	8 (4.1)	15 (2.1)	0.10	4 (3.5)	12 (2.2)	0.42	4 (4.9)	3 (1.5)	0.10
All TE	10 (5.1)	20 (2.7)	0.09	5 (4.4)	16 (3.0)	0.44	5 (6.2)	4 (2.1)	0.08
All bleeding									
12 months	51 (26.2)	154 (21.1)	0.13	31 (27.2)	102 (19.0)	0.050	20 (24.7)	52 (26.8)	0.72
In-hospital	26 (13.3)	77 (10.5)	0.27	14 (12.3)	55 (10.3)	0.53	12 (14.8)	22 (11.3)	0.43
BARC >2									
12 months	24 (12.3)	71 (9.7)	0.29	15 (13.2)	44 (8.2)	0.10	9 (11.1)	27 (13.9)	0.53
In-hospital	9 (4.6)	31 (4.2)	0.82	4 (3.5)	22 (4.1)	0.77	5 (6.2)	9 (4.6)	0.60

Abbreviations: BARC, Bleeding Academic Research Consortium; MACCE, major adverse cardiac and cerebrovascular events; MI, myocardial infarction; OG, octogenarians; ST, stent thrombosis; TE, thromboembolism; TIA, transient ischemic attack. Data are presented as n (%).

4.1 | Study limitations

The current study has all the inherent limitations of an observational study design, including unmeasured confounders and individual decision-making in treatment choice. Another limitation is the heterogeneity of cohort among the participating centers and some variations in periprocedural routines. The statistical power of our study is limited by the absolute low rates of ST and stroke and a relatively small sample size. Therefore, lack of significant difference between comparison groups might be due to type II statistical error. We could not provide data on adherence to OAC and antiplatelet medications in either group. The strength of the registry is enrollment of consecutive patients with the only exclusion criterion being unwillingness or inability to participate. In this sense, the registry cohort well represents real-world patients with AF referred for PCI.

5 | CONCLUSION

In a real-world cohort of patients with AF who underwent PCI, patients aged ≥ 80 years had a higher incidence of MACCE at 12-month follow-up in comparison with younger patients, although they received comparable antithrombotic treatment. The bleeding events did not differ between octogenarians and younger patients, despite higher bleeding risk assessed by HAS-BLED score.

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Conflicts of interest

The authors declare no potential conflicts of interest.

Author contributions

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