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'Real-world' antithrombotic treatment in atrial fibrillation: the EURObservational Research Programme Atrial Fibrillation General Pilot survey

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'Real-world' antithrombotic treatment in atrial fibrillation:

the EURObservational Research Programme Atrial Fibrillation General Pilot survey

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Running heading Antithrombotic treatment in atrial fibrillation

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COMPETING INTERESTS

GYHL - consultant for Bayer, Medtronic, Sanofi, BMS/Pfizer, Daiichi-Sankyo and Boehringer Ingelheim, and has been a speaker for Bayer, BMS/Pfizer, Boehringer Ingelheim, Daiichi-Sankyo and Medtronic.

LHR - speaker bureaus for Bayer, BMS/Pfizer, Janssen Pharmaceuticals, Takeda, Roche Diagnostics and Boehringer Ingelheim.

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Prof. Giuseppe Boriani received small speaker's fees from Medtronic Inc and Boston Scientific

CL, G-AD, MS, ZK, MIP, OT, PC, CFH, BM, APM – None declared in relation to this manuscript

Author contributions

GYHL – original idea, supervised the research, wrote the 1st draft and made revisions; Chairman of EORP-AF executive steering committee

CL –statistical analyses, edited and revised the article.

G-AD, MS, ZK, MIP, OT, PC, CFH, BM, APM – All authors had a role in drafting and writing the manuscript.

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Abstract

Background Current guidelines strongly recommend that oral anticoagulation can be offered to patients with atrial fibrillation and ≥1 stroke risk factors. Also, the guidelines recommend that oral anticoagulation should still be used in the presence of stroke risk factors irrespective of rate or rhythm control

Methods and Results In an analysis from the dataset of the Euro Observational Research Programme on Atrial Fibrillation (EORP-AF) Pilot survey (n=3119), we examined antithrombotic therapy prescribing, with particular focus on the risk factors determining oral anticoagulation or antiplatelet therapy use.

Where oral anticoagulation was used amongst admitted patients in whom no pharmacological cardioversion, electrical cardioversion or catheter ablation was performed or planned, the majority were prescribed Vitamin K Antagonist therapy (72.2%) whilst novel oral anticoagulants were used on the minority (7.7%). There were no significant difference in bleeding risk factors between the patients treated on the different types of antithrombotic therapies, except for chronic kidney disease, where oral anticoagulation was less commonly used (p=0.0318). Antiplatelet therapy was more commonly used in patients with high HAS-BLED score (≥2) (p<0.0001).

Higher oral anticoagulation use was associated with female gender(p=0.0245). Less novel oral anticoagulants use was associated with valvular heart disease (p<0.0001), chronic heart failure(p=0.0010), coronary artery disease(p<0.0001) and peripheral artery disease (p=0.0092). Coronary artery disease was the strongest reason for combination therapy with oral anticoagulation plus antiplatelet drug (OR 8.54, p<0.0001).

When the CHA_2DS_2-VASc score was used, 95.6% with a score of ≥1 received antithrombotic therapy, with 80.5% with a score of ≥1 receiving oral anticoagulation. Of note, 83.7% of those with a score ≥2 received Antithrombotic Therapy; of the latter, 70.9% of those with a score ≥2 received oral anticoagulation. Of the latter, Vitamin K Antagonists were used in 64.1% and novel oral anticoagulants in 6.9%.

Conclusion The EORP-AF Pilot survey provides contemporary data on oral anticoagulation prescribing by European cardiologists for atrial fibrillation. Whilst the uptake of oral anticoagulation (mostly Vitamin K Antagonist therapy) has improved since the EuroHeart

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survey a decade ago, antiplatelet therapy is still commonly prescribed, with or without oral anticoagulation, whilst elderly patients are commonly undertreated with oral anticoagulation.

Key words atrial fibrillation, oral anticoagulation, stroke, bleeding

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Introduction

Stroke prevention is central to the management of atrial fibrillation (AF)[1]. This common arrhythmia is associated with a high risk of stroke and thromboembolism, and where strokes occur in association with atrial fibrillation, there is a greater mortality and morbidity with more disability, longer hospital stays and lower rate of discharge to the patient's own home[1].

In the EuroHeart survey report from 2006, the Nieuwlaat et al[2] concluded that antithrombotic therapy in atrial fibrillation was hardly tailored to the patient's stroke risk profile, and suggested that factors other than well-known stroke risk factors were significantly involved in antithrombotic management decisions. There was a call that guideline writers and physician educators should focus on providing one uniform and easy to use stroke risk stratification scheme. Since the EuroHeart survey, the ESC has produced new guidelines[3] and introduced use of the CHA_2DS_2-VASc [Cardiac failure or dysfunction, Hypertension, Age≥75 [Doubled], Diabetes, Stroke [Doubled]-Vascular disease, Age 65-74, and Sex category[female]][4] and HAS-BLED (Hypertension, Abnormal renal/liver function, Stroke, Bleeding history or predisposition, Labile international normalized ratio, Elderly (>65 years), Drugs/alcohol concomitantly)[5] scores for stroke and bleeding risk stratification, respectively. The availability of novel oral anticoagulants have also changed the landscape for stroke prevention, given their efficacy, safety and relative convenience[6].

Of importance, the 2012 focused update of the European Society of Cardiology (ESC) guidelines strongly recommended a clinical practice shift, so that the initial decision step is the identification of 'truly low risk' patients with atrial fibrillation who do not need any antithrombotic therapy[3]. Subsequent to this step, effective stroke prevention (essentially oral anticoagulation) can be offered to patients with ≥1 stroke risk factors. More recently, similar recommendations from the Asia Pacific Heart Rhythm Society were published[7]. Also, the ESC guidelines recommended that oral anticoagulation should still be used in the presence of stroke risk factors irrespective of rate or rhythm control, and irrespective of whether the latter was successful[3]. American and Canadian guidelines are broadly similar,

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recommending oral anticoagulation for patients with stroke risk factors, irrespective of whether or not a rhythm control strategy was successful[8-10].

In this analysis from the baseline dataset of the Euro Observational Research Programme on Atrial Fibrillation (EORP-AF) Pilot survey, we examined antithrombotic therapy prescribing, with particular focus on the risk factors determining oral anticoagulation or antiplatelet therapy use. Furthermore, we also assessed the uptake of oral anticoagulation use amongst patients undergoing rhythm control (whether cardioversion or ablation).

Methods

The full baseline features and results from the EORP-AF Pilot survey have been previously published[11]. In this ancillary analysis, we focused on the clinical features associated with antithrombotic therapy use. In brief, the registry population comprised consecutive in- and out-patients with atrial fibrillation presenting to cardiologists in participating ESC countries. Consecutive patients were screened for eligibility at the time of their presentation to a cardiologist (hospital or medical centre). All patients provided written informed consent. Patients with the primary or secondary recorded diagnosis of atrial fibrillation were included.

Patients were officially enrolled in the EORP-AF only if an ECG diagnosis (12-lead ECG, 24-hour Holter, or other electrocardiographic documentation) confirming atrial fibrillation was made. The qualifying episode of atrial fibrillation should have occurred within the last year, and patients did not need to be in atrial fibrillation at the time of enrolment. For the pilot phase, 9 countries formally participated. A minimum of 20 consecutive patients per centre were to be enrolled, with a target of 3000 patients. Enrolment into the registry started in February 2012, and the end of enrolment was March 2013.

Statistical analyses

Univariate analysis was applied to both continuous and categorical variables. Continuous variables were reported as mean±SD or as median and Interquartile Range (IQR). Among-

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group comparisons were made using a non-parametric test (Kruskal-Wallis test). Categorical variables were reported as percentages. Among-group comparisons were made using a Chi-square test or a Fisher's Exact test if any expected cell count was less than five.

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Results

We enrolled a total of 3119 patients from February 2012 to March 2013. Characteristics vs. antithrombotic drug use of hospital admitted patients in whom no pharmacological or electrical cardioversion (PCV and ECV, respectively) and catheter ablation was performed or planned are shown in Table 1. In the whole cohort, where oral anticoagulation was used, the majority were prescribed Vitamin K Antagonist therapy (651/902=72.2%) whilst novel oral anticoagulants were used on the minority (69/902=7.7%). No antithrombotic therapy was used in 2.7% (24/902).

Oral anticoagulation was commonly prescribed for permanent atrial fibrillation, usually where heart failure (39.4%) or other cardiac diseases were present. Antiplatelet therapy was commonly prescribed, with or without where there was co-existent myocardial infarction or coronary artery disease.

The mean age of patients prescribed oral anticoagulation was lower than those prescribed antiplatelet therapy alone ($p<0.0001$). There were similar proportions of females prescribed both oral anticoagulation and antiplatelet therapy [Table 1]. Stroke risk factors were not different between various antithrombotic therapy regimes, apart from heart failure (68.5% receiving oral anticoagulation, $p=0.0014$), coronary artery disease (more antiplatelet therapy, $p<0.0001$) and peripheral artery disease (more antiplatelet therapy, $p=0.0031$).

There were no significant difference in bleeding risk factors between the different types of antithrombotic therapies used, except for chronic kidney disease, where oral anticoagulation was less commonly used ($p=0.0318$). Antiplatelet therapy was more commonly used in patients with high HAS-BLED score (≥2) ($p<0.0001$).

Paroxysmal atrial fibrillation were less likely to receive oral anticoagulation, compared to permanent atrial fibrillation – although only of the latter, >60% received oral anticoagulation alone or in combination with antiplatelet therapy ($p=0.0018$). With regard

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to management strategy, of those undergoing rate control, most received oral anticoagulation alone or in combination with antiplatelet therapy (p=0.0052).

Of those receiving oral anticoagulation alone, Vitamin K Antagonists were used in 90.4% (651/720) and novel oral anticoagulants in 9.6% (69/720). Amongst those receiving combination oral anticoagulation plus antiplatelet therapy, the oral anticoagulant used was a Vitamin K Antagonist in 92.7% (179/193) and novel oral anticoagulants in 7.8% (15/193).

Factors associated with oral anticoagulation prescription

Factors associated with oral anticoagulation prescription are shown in Table 2. Higher oral anticoagulation use was associated with female gender (p=0.0245). Less oral anticoagulation use was associated with valvular heart disease, heart failure, coronary or peripheral artery disease (p<0.0001), diabetes mellitus (p=0.0012) and subtype of atrial fibrillation (p=0.0474) [Table 2a].

Higher novel oral anticoagulants use was associated with previous transient ischaemic attack/stroke (p=0.0235) and heart rhythm strategy (p=0.0153). Less novel oral anticoagulants use was associated with valvular heart disease (p<0.0001), chronic heart failure (p=0.0010), CAD (p<0.0001) and peripheral artery disease (p=0.0092) [Table 2b].

Factors associated with antiplatelet drug prescription

Factors associated with antiplatelet drug prescription are shown in Table 2c. Higher antiplatelet drug use was associated with female gender (p=0.0428), coronary artery disease (p<0.0001) and type of atrial fibrillation (p=0.0004), with less use in previous stroke/transient ischaemic attack (p=0.0123), diabetes (p=0.0426) [Table 2c].

Factors associated with oral anticoagulation plus antiplatelet drug prescription

Factors associated with combination oral anticoagulation plus antiplatelet drug prescriptions are shown in Table 2d. Higher combination therapy with oral anticoagulation plus antiplatelet drug use was associated with age, valvular heart disease, chronic heart failure, hypertension, coronary and peripheral artery disease, and diabetes (all p<0.0001). Coronary artery disease was the strongest reason for combination therapy (OR 8.54, p<0.0001) [Table 3].

There was less combination therapy with oral anticoagulation plus antiplatelet drug use in females (p=0.0002), previous stroke/transient ischaemic attack (p=0.0159) and heart rhythm strategy (p=0.0004).

Risk factors for stroke

In the whole cohort, the commonest risk factors for stroke were heart failure (47.5%) and hypertension (29.3%). Amongst the anticoagulated cohort, the most common stroke risk factor was hypertension (70.5%) [Table 3].

Antithrombotic therapy use based on $CHADS_2$ and CHA_2DS_2-VASc scores

Based on the $CHADS_2$ score, 89.3% of those with a score of ≥1 received Antithrombotic Therapy. Of the latter, 75.7% (2243/2964) of those with a score of ≥1 received oral anticoagulation: Vitamin K Antagonists were used in 68.1% (2019/2964) and novel oral anticoagulants used in 7.7% (228/2964).

When the CHA_2DS_2-VASc score was used, 95.6% with a score of ≥1 received Antithrombotic Therapy, with 80.5% (2386/2964) with a score of ≥1 receiving oral anticoagulation. Of note, 83.7% of those with a score ≥2 received Antithrombotic Therapy; of the latter, 70.9% (2101/2964) of those with a score ≥2 received oral anticoagulation. Of the latter anticoagulated patients with a CHA_2DS_2-VASc score ≥2, Vitamin K Antagonist were used in 64.1% (1900/2964) and novel oral anticoagulants in 6.9% (204/2964).

Antithrombotic therapy use based on rhythm control

Pharmacological and electrical cardioversion was planned or performed in 763 and 703 subjects, respectively – whilst catheter ablation was performed or planned in 231 subjects. Clinical characteristics of these patients are summarised in Table w1.

For patients where pharmacological cardioversion was performed or planned (n=763), oral anticoagulation was used in the majority of cases (at least 66.6% at discharge in those where pharmacological cardioversion performed, or at least 92.3% where planned). No antiplatelet therapy was used where oral anticoagulation was planned [Table 4, Figure 2]. In the patients undergoing pharmacological cardioversion where oral anticoagulation was

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used, the majority were prescribed Vitamin K Antagonist therapy (92.1%, 477/518 at discharge) whilst novel oral anticoagulants were used on the minority (8.1%, 42/518 at discharge)[1]. No antithrombotic therapy was used (or status unknown) in 9.1%.

For patients where electrical cardioversion was performed or planned (n=703), oral anticoagulation was used in the majority of cases (at least 85.5% at discharge in those where electrical cardioversion performed, or at least 90.2% where planned). No antiplatelet therapy was used where oral anticoagulation was planned [Table 5, Figure 2]. In the patients undergoing electrical cardioversion where oral anticoagulation was used, the majority were prescribed Vitamin K Antagonist therapy (86.3%, 466/540 at discharge) whilst novel oral anticoagulants were used on the minority (13.7%, 74/540 at discharge). No antithrombotic therapy was used (or status unknown) in 4.9%.

Amongst patients where catheter ablation was performed or planned, oral anticoagulation was used in the majority of patients (at least 88.1% at discharge amongst those where ablation performed, at least 73.3% where planned) [Table 6]. In the patients undergoing ablation where oral anticoagulation was used, the majority were prescribed Vitamin K Antagonist therapy (88.1%, 148/168 at discharge) whilst novel oral anticoagulants were used on the minority (11.9%, 20/168 at discharge). No antithrombotic therapy was used in 7.1% (2.7% performed and 4.4% planned).

[1] There is one patient who received both VKA and NOAC, so n=477 plus 42 does not equal to 518

Discussion

In this report from the EORP-AF Pilot survey, we found that oral anticoagulation was commonly used for atrial fibrillation, especially where heart failure or other cardiac diseases were present. However, antiplatelet therapy was still commonly prescribed, with or without oral anticoagulation where there was co-existent myocardial infarction or coronary artery disease. Elderly patients being less prescribed oral anticoagulation and antiplatelet therapy alone being more commonly prescribed. When the CHA_2DS_2-VASc score was used, 95.58% with a score of ≥1 received oral anticoagulation.

Unsurprisingly, oral anticoagulation was commonly used for atrial fibrillation, usually where clinical heart failure or other cardiac disease was present. A clinical diagnosis of 'heart failure' was not an independent predictor for stroke in the systematic review from the Stroke in Atrial Fibrillation Working Group[12], nor in the Swedish atrial fibrillation cohort study[13]. However, the presence of moderate-severe systolic impairment on 2-D echocardiograohy is an independent predictor of stroke[14]. The 'C' in CHA_2DS_2-VASc has been defined as referring to the presence of moderate-severe systolic impairment, or recent decompensation irrespective of ejection fraction, given that such patients are still at high risk of thromboembolism[15].

Antiplatelet therapy was commonly prescribed, with or without oral anticoagulation where there was co-existent myocardial infarction or coronary artery disease. Antiplatelet monotherapy was also commonly prescribed in such patients. The presence of vascular disease independently increases the risk of stroke in atrial fibrillation[13, 16]. Thus, in atrial fibrillation patients with stable vascular disease, oral anticoagulation is the preferred treatment option, as combination therapy does not reduce thromboembolism but substantially increases the risk of major bleeding, especially intracranial haemorrhage[17]. The situation in patients with atrial fibrillation presenting with an acute coronary syndrome and/or undergoing angioplasty or stenting is complex, with guidelines recommending a period of triple therapy, followed by oral anticoagulation plus single antiplatelet, then oral anticoagulation alone[18, 19]. Recent data from one small randomised trial and a nationwide

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cohort study suggest that oral anticoagulation plus clopidogrel would suffice post acute coronary syndrome treated with coronary stenting[20].

Bleeding risk factors were similar between the different types of antithrombotic therapies used, except that where oral anticoagulation was less commonly used in chronic kidney disease[21]. The latter atrial fibrillation patients are at higher risk of thromboembolism, myocardial infarction and death, as well as major bleeding[22, 23] ENREF 18. As with the original EuroHeart survey, oral anticoagulation was also less used in paroxysmal atrial fibrillation, although such patients remain at high risk of thromboembolism[24, 25]. Indeed, guidelines emphasise that in the presence of stroke risk factors, oral anticoagulation should be prescribed irrespective of clinical type of atrial fibrillation (paroxysmal, persistent, permanent)[3].

There was a tendency to younger patients being prescribed less oral anticoagulation and antiplatelet therapy alone being more commonly prescribed in the elderly. In the elderly trials, oral anticoagulation was associated with a significant reduction in thromboembolism and the risk of major bleeding or adverse effects were similar of higher with aspirin compared to warfarin in the elderly[26, 27]. Antiplatelet therapy was also more commonly used in patients with high HAS-BLED score, perhaps due to the perception that aspirin was a safer alternative to oral anticoagulants. As mentioned, the evidence is clear that the risk of major bleeding (or intracranial bleeding) with aspirin is not significantly different to oral anticoagulation, especially in the elderly[28]. Thus, recent treatment guidelines from Europe and North America have downgraded the role of aspirin for stroke prevention in atrial fibrillation, given its limited (or lack of) efficacy and poor safety[3, 8].

In the whole cohort, the commonest risk factors for stroke were heart failure and hypertension. This is in keeping with various epidemiological datasets or surveys where heart failure and hypertension were also the commonest aetiological factors for atrial fibrillation, and in addition, contributes to its thromboembolic complications[29 30].

Reassuringly, based on the $CHADS_2$ score, 89.34% of those with a score of ≥1 received oral anticoagulation. When the CHA_2DS_2-VASc score was used, 95.58% with a score of ≥1 received oral anticoagulation, and 83.67% of those with a score ≥2 received oral

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anticoagulation. This is an improvement over reported data in the EuroHeart survey[2], with an increase of oral anticoagulation use amongst cardiologists. Indeed, this may reflect the introduction of new guidelines, where in the 2012 focused update of the ESC guideline, the initial decision step is to identify 'low risk' patients who did not need any antithrombotic therapy (ie. age <65 and lone atrial fibrillation; otherwise a CHA_2DS_2-VASc score=0 (male) or CHA_2DS_2-VASc score=1 (female))[3, 31]. Subsequent to this step, patients with ≥1 stroke risk factors can be offered effective stroke prevention, which is oral anticoagulation, whether given as well controlled Vitamin K Antagonist therapy (with a high time in therapeutic range, >70%[32]) or one of the novel oral anticoagulants.

Despite a preference for its use in the ESC guidelines, novel oral anticoagulants were prescribed in the minority, but this survey shows it use particularly in patients with previous transient ischaemic attack/stroke or rhythm control. Less novel oral anticoagulants were used in association with valvular heart disease, heart failure and vascular disease. The latter may be due to concerns, particularly with dabigatran, in patients with associated coronary artery disease[33]. Also, novel oral anticoagulants should not be used with haemodynamically significant valvular heart disease or prosthetic mechanical valves[34]. Wider use of novel oral anticoagulants would have implications for improved stroke prevention outcomes in Europe, given their relative efficacy, safety and convenience compared to Vitamin K Antagonists that ultimately lead to a greater net clinical benefit overall[35, 36] _ENREF_31. Also, not all the novel oral anticoagulants were available in some participating countries at the time of data collection.

Oral anticoagulation is also needed in the setting of rhythm control therapy. Pharmacological and electrical cardioversion was planned or performed in 763 and 703 subjects, respectively – whilst catheter ablation, oral anticoagulation was used in the majority. The proportion where oral anticoagulation was not used could be explained by the proportion of new onset atrial fibrillation patients where oral anticoagulation is not initiated in some countries where early conversion to sinus rhythm is achieved. Nonetheless, the ESC guidelines do recommend that oral anticoagulation is used in the presence of stroke risk factors, whether or not a successful rhythm control strategy (ie. cardioversion or ablation) is achieved[3].

We did not have data on quality of anticoagulation control, with no data on time in therapeutic range (TTR), which is highly relevant given that TTR is a major determinant of thromboembolism , bleeding and death in patients being treated with Vitamin K Antagonists[37]. Also, we did not have detailed data on biochemical parameters, nor outcomes which will be addressed by the ongoing follow-up phase of the EORP-AF Pilot, due to report in late 2014.

In conclusion, the EORP-AF Pilot survey provides contemporary data on oral anticoagulation prescribing by European cardiologists for atrial fibrillation. Whilst the uptake of oral anticoagulation (mostly Vitamin K Antagonist therapy) has improved since the EuroHeart survey a decade ago, antiplatelet therapy is still commonly prescribed, with or without oral anticoagulation, whilst elderly patients are commonly undertreated with oral anticoagulation.

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Data monitor and technical support team:

Data collection was conducted by the EurObservational Research Program department from the European Cardiac Society by Viviane Missiamenou. Statistical analyses were performed by Cécile Laroche with the support of Renato Urso. Overall activities were coordinated by Aldo P Maggioni (Scientific Coordinator EORP) and Thierry Ferreira (Head of Department EORP)

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Webonly Supplementary Table

Table w1 Characteristics of patients in whom an intervention to restore sinus rhythm was performed or planned.

	PCV		ECV		Catheter ablation	
	N=763		N=703		N=231	
	Performed	Planned	Performed	Planned	Performed	Planned
	N=750	N=13	N=612	N=91	N=186	N=45
Demographics:						
Age (years) (mean ± SD)	67.9±11.7	68.2±9.2	66.0±11.3	64.2±9.8	59.4±10.8	62.9±9.0
Age (years) (median, IQR)	69.0 (61.0-76.0)	65.0 (63.0-74.0)	67.0 (59.0-74.0)	64.0 (59.0-71.0)	61.0 (53.0-67.0)	62.0 (57.0-70.0)
Female gender (%)	46.27	30.77	34.31	28.57	35.48	40.00
Duration of current AF episode (%):						
<24 hours	40.40	15.38	22.71	5.49	30.11	26.67
24 hours to 7 days	18.67	7.69	14.54	19.78	8.60	15.56
>7 days	27.87	53.85	48.37	63.74	25.81	33.33
Unknown	13.07	23.08	14.38	10.99	35.48	24.44
CHA_2DS_2-VASc (%):						
0 (all) & 1 (females)	8.93	15.38	11.60	9.89	27.42	17.78
1 (males)	8.53	15.38	18.46	26.37	24.19	6.67
2 and more (all)	82.53	69.23	69.93	63.74	48.39	75.56

PCV, Pharmacological cardioversion; ECV, electrical cardioversion

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Table 1

Characteristics vs. antithrombotic drug use of hospital admitted patients in whom no PCV and ECV and catheter ablation was performed or planned.

	Whole Cohort	None & unknown	OAC Alone	AP Alone	OAC + AP	Other[a]	p- value
N:	902	24	482	127	193	76	
Reason for visit:							
Atrial fibrillation (%)	31.60	58.33	34.85	30.71	22.80	26.32	<0.0001
Acute myocardial infarction (%)	8.20	4.17	0.83	16.54	20.73	10.53	
Valvular heart disease (%)	7.10	4.17	6.43	6.30	6.74	14.47	
Hypertension (%)	1.33	0.00	1.66	0.79	1.04	1.32	
Heart failure (%)	31.60	20.83	39.42	29.13	18.65	22.37	
Other coronary artery disease (%)	8.87	0.00	2.90	9.45	21.24	17.11	
Other cardiac (%)	8.54	12.50	11.41	3.94	6.22	2.63	
Other non-cardiac reason (%)	2.77	0.00	2.49	3.15	2.59	5.26	
Demographics:							
Age (years) (mean ± SD)	71.16±11.3	61.46±14.6	70.16±11.4	75.27±11.3	71.62±10.4	72.53±9.0	<0.0001
Age (years) (median, IQR)	73.0 (64.0-79.0)	64.5 (49.0-72.5)	72.0 (64.0-78.0)	77.0 (67.0-84.0)	72.0 (64.0-79.0)	73.0 (66.0-80.0)	
Female gender (%)	41.02	20.83	45.85	44.09	33.68	30.26	0.0018
Stroke risk factors:							
Valvular heart disease (%)	72.10	57.89	70.26	75.41	74.87	74.67	0.3636
Ischaemic thromboembolic complications (%)	16.63	4.17	17.12	11.02	20.42	17.33	0.1051
Previous TIA (%)	4.81	0.00	4.40	4.72	6.77	4.05	0.5425
Previous stroke (%)	7.91	0.00	8.54	6.35	7.25	10.67	0.4564
Chronic heart failure (%)	63.37	63.16	68.52	54.76	56.77	62.67	0.0014
Hypertension (%)	74.05	54.17	73.28	72.22	76.68	81.58	0.0830

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Coronary artery disease (%)	47.59	31.25	26.47	61.61	81.87	62.50	<0.0001
Peripheral vascular disease (%)	15.01	4.76	12.36	15.20	19.27	22.97	0.0305
Diabetes mellitus (%)	26.67	20.83	27.23	19.69	29.26	30.26	0.3075
Bleeding risk factors:							
Haemorrhagic events (%)	9.15	8.33	8.77	7.20	8.33	17.11	0.1578
Malignancy (%)	4.60	8.33	4.17	4.07	4.21	8.11	0.5269
Chronic kidney disease (%)	21.62	33.33	19.09	30.71	19.69	23.68	0.0318
Type of AF:							
First detected (%)	36.49	29.17	37.77	46.83	32.98	21.92	0.0018
Paroxysmal (%)	19.04	33.33	16.09	20.63	22.34	21.92	
Persistent (%)	12.54	16.67	12.02	7.14	13.30	21.92	
Long standing persistent (%)	2.39	0.00	1.50	4.76	2.13	5.48	
Permanent (%)	29.53	20.83	32.62	20.63	29.26	28.77	
Heart rhythm strategy:							
Rate control only (%)	63.53	45.83	63.69	54.33	65.80	77.63	0.0052
Rate and rhythm control (%)	24.61	33.33	23.24	30.71	27.98	11.84	
Rhythm control only (%)	5.54	12.50	6.22	8.66	2.59	1.32	
Observation (%)	6.32	8.33	6.85	6.30	3.63	9.21	
HAS-BLED Score:							<0.0001
0	13.64	37.5	17.01	7.87	6.74	11.84	
1	34.15	20.83	42.74	21.26	26.94	23.68	
≥2	52.22	41.67	40.25	70.87	66.32	64.47	

[a] Others include: OAC+Other Antithrombotic Therapy, AP+Other Antithrombotic Therapy, OAC+AP+Other Antithrombotic Therapy and Other Antithrombotic Therapy (Fondaparinux, LMW heparin, UF heparin, Other).

OAC, oral anticoagulation. ATT, antithrombotic therapy; LMW, low molecular weight; UF, unfractionated; TIA, transient ischaemic attach

Table 2

(a) Factors associated with prescription of OAC Alone (Vitamin K Antagonists plus NOACs)

	Odds Ratio	95% Confidence Limits		*p*-value
Age (%), (*ref.<65 years)*	0.9211	0.7942	1.0683	0.2773
Female gender (%)	**1.1813**	**1.0216**	**1.3661**	**0.0245**
Valvular heart disease (%)	**0.6592**	**0.5645**	**0.7697**	**<0.0001**
Previous TIA / Stroke (%)	1.2558	0.9788	1.6111	0.0728
Chronic heart failure (%)	**0.6343**	**0.5477**	**0.7345**	**<0.0001**
Hypertension **(%)**	0.9815	0.8393	1.1479	0.8153
Coronary artery disease (%), CAD	**0.1781**	**0.1500**	**0.2114**	**<0.0001**
Peripheral vascular disease (%), PAD	**0.5505**	**0.4367**	**0.6939**	**<0.0001**
Diabetes mellitus (%)	**0.7488**	**0.6286**	**0.8919**	**0.0012**
Type of AF (%), (*ref.= First detected)*	**0.8549**	**0.7321**	**0.9983**	**0.0474**
Heart rhythm strategy (%), (*ref.=Rhythm control only)*	1.1779	0.9516	1.4581	0.1323

(b) Factors associated with prescription of NOACs only (Dabigatran or Rivaroxaban).

	Odds Ratio	95% Confidence Limits		*p*-value
Age (%), (*ref < 65 years)*	0.7937	0.6136	1.0266	0.0779
Female gender (%)	1.0306	0.7972	1.3324	0.8178
Valvular heart disease (%)	**0.5820**	**0.4480**	**0.7561**	**<0.0001**
Previous TIA / Stroke (%)	**1.5439**	**1.0575**	**2.2540**	**0.0235**
Chronic heart failure (%)	**0.6401**	**0.4897**	**0.8366**	**0.0010**
Hypertension **(%)**	0.9136	0.6943	1.2021	0.5186
Coronary artery disease (%), CAD	**0.4786**	**0.3448**	**0.6645**	**<0.0001**
Peripheral vascular disease (%), PAD	**0.4870**	**0.2802**	**0.8465**	**0.0092**
Diabetes mellitus (%)	0.8550	0.6172	1.1844	0.3457
Type of AF (%), (*ref.= First detected)*	1.1720	0.8948	1.5352	0.2487
Heart rhythm strategy (%), (*ref.=Rhythm control only)*	**1.5086**	**1.0800**	**2.1074**	**0.0153**

OAC, oral anticoagulation.

(c) Factors associated with prescription of Antiplatelet Drugs Alone.

	Odds Ratio	95% Confidence Limits		*p*-value
Age (%), (*ref < 65 years)*	1.0643	0.8545	1.3256	0.5781
Female gender (%)	**1.2433**	**1.0068**	**1.5353**	**0.0428**
Valvular heart disease (%)	1.0511	0.8374	1.3192	0.6674
Previous TIA / Stroke (%)	**0.5798**	**0.3766**	**0.8927**	**0.0123***
Chronic heart failure (%)	0.8658	0.6974	1.0749	0.1916
Hypertension (%)	0.9752	0.7749	1.2271	0.8301
Coronary artery disease, CAD (%)	**1.7052**	**1.3578**	**2.1414**	**<0.0001**
Peripheral vascular disease, PAD (%)	0.8938	0.6304	1.2672	0.5283
Diabetes mellitus (%)	**0.7505**	**0.5683**	**0.9913**	**0.0426**
Type of AF (%), (*ref.= First detected)*	**1.4784**	**1.1878**	**1.8401**	**0.0004**
Heart rhythm strategy (%), (*Ref.=Rhythm control only)*	1.2820	0.9576	1.7162	0.0944

(d) Factors associated with prescription of OAC in combination with Antiplatelet Drugs.

	Odds Ratio	95% Confidence Limits		*p*-value
Age (%), (*ref.age <65 years)*	**1.5873**	**1.3031**	**1.9334**	**<0.0001**
Female gender (%)	**0.7000**	**0.5798**	**0.8450**	**0.0002**
Valvular heart disease (%)	**1.9615**	**1.5957**	**2.4111**	**<0.0001**
Previous TIA / Stroke (%)	**0.5798**	**0.3766**	**0.8927**	**0.0159**
Chronic heart failure (%)	**2.3415**	**1.9411**	**2.8246**	**<0.0001**
Hypertension (%)	**1.8098**	**1.4553**	**2.2508**	**<0.0001**
Coronary artery disease, CAD (%)	**8.5486**	**6.8823**	**10.6182**	**<0.0001**
Peripheral vascular disease, PAD (%)	**2.5063**	**1.9551**	**3.2129**	**<0.0001**
Diabetes mellitus (%)	**1.8228**	**1.4855**	**2.2368**	**<0.0001**
Type of AF (%), (*ref.= First detected)*	0.8547	0.6993	1.0447	0.1251
Heart rhythm strategy (%), (*Ref.=Rhythm control only)*	**0.5789**	**0.4253**	**0.7879**	**0.0004**

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Table 3

Prevalence of risk factors for stroke in patients according to the ESC Guidelines.

	Whole Cohort		OAC Alone	
	N	%	N	%
Heart failure (%)	1411	47.48	739	42.74
Hypertension (%)	909	29.29	1262	70.54
Age (%):				
<65	1030	33.02	613	34.04
65-74	1038	33.28	631	35.04
≥75	1051	33.70	557	30.93
Diabetes mellitus (%)	638	20.57	333	18.56
Previous TIA (%)	126	4.09	81	4.53
Previous stroke (%)	195	6.30	120	6.68
Ischaemic thromboembolic complications (%)	405	13.09	250	13.94
Peripheral vascular disease (PAD) (%)	328	11.03	143	8.47
Myocardial infarction (MI) (%)	439	16.33	113	7.30
Female (%)	1260	40.40	758	42.09

TIA, transient ischaemic attack

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Table 4 Antithrombotic prescription at inclusion and at discharge when the following pharmacological cardioversion were either performed at the time of the survey or planned at discharge

(a) Pharmacological cardioversion								
	Performed (n=750)				Planned (n=13)			
	Inclusion		Discharge		Inclusion		Discharge	
	N	%	N	%	N	%	N	%
None & Unknown	286	38.1	68	9.1	2	15.4	0	0.0
OAC Alone	188	25.1	280	37.3	8	61.5	3	69.2
Antiplatelet Alone	190	25.3	147	19.6	2	15.4	0	0.0
OAC + Antiplatelet	66	8.8	220	29.3	1	7.7	0	23.1
Others[a]	20	2.7	35	4.7	0	0	0	7.7
Total	***750***	***100.0***	***750***	***100.0***	***13***	***100.0***	***3***	***100.0***

[a] Others include: OAC + Other ATT, AP + Other ATT, OAC +AP + Other ATT and Other ATT (Fondaparinux, LMW heparin, UF heparin, Other).

(b) Vitamin K Antagonists or NOAC use												
	Performed						Planned					
	Inclusion (N)			Discharge (N)			Inclusion (N)			Discharge (N)		
	VKA	NOAC	Total	VKA	NOAC	Total	VKA	NOAC	Total	VKA	NOAC	Total
OAC Alone	170	18	188	248	32	280	6	2	8	6	3	9
OAC + Antiplatelet	61	5	66	212	9	220	1	0	1	3	0	3
OAC + Others[b]	4	1	5	17	1	18	0	0	0	1	0	1
Total	***235***	***24***	***259***	***477***	***42***	***518***	***7***	***2***	***9***	***10***	***3***	***13***

[b] Others include: OAC + Other ATT and OAC + AP + Other ATT

Table 5 Antithrombotic prescription at inclusion and at discharge when the following electrical cardioversion were either performed at the time of the survey or planned at discharge

(a) Electrical cardioversion								
	Performed (n=612)				Planned (n=91)			
	Inclusion		Discharge		Inclusion		Discharge	
	N	%	N	%	N	%	N	%
None & Unknown	64	10.5	23	3.8	23	25.3	1	1.1
OAC Alone	406	66.3	430	70.3	41	45.1	74	81.3
Antiplatelet Alone	45	7.4	37	6.1	19	20.9	0	0.0
OAC + Antiplatelet	85	13.9	93	15.2	6	6.6	8	8.8
Others[a]	12	2.0	29	4.7	2	2.2	8	8.8
Total	***612***	***100.0***	***612***	***100.0***	***91***	***100.0***	***91***	***100.0***

[a] Others include: OAC+Other ATT, AP+Other ATT, OAC+AP+Other ATT and Other ATT (Fondaparinux, LMW heparin, UF heparin, Other).

(b) VKA or NOAC use												
	Performed						Planned					
	Inclusion (N)			Discharge (N)			Inclusion (N)			Discharge (N)		
	VKA	NOAC	Total	VKA	NOAC	Total	VKA	NOAC	Total	VKA	NOAC	Total
OAC Alone	350	56	406	364	66	430	38	3	41	64	10	74
OAC + Antiplatelet	78	7	85	85	8	93	6	0	6	8	0	8
OAC + Others[b]	1	0	1	17	0	17	0	0	0	5	0	5
Total	***429***	***63***	***492***	***466***	***74***	***540***	***44***	***3***	***47***	***77***	***10***	***87***

[b] Others include: OAC+Other ATT and OAC+AP+Other ATT

Table 6 Antithrombotic prescription at inclusion and at discharge when the following catheter ablation were either performed at the time of the survey or planned at discharge

(a) Catheter ablation								
	Performed (n=186)				Planned (n=45)			
	Inclusion		Discharge		Inclusion		Discharge	
	N	%	N	%	N	%	N	%
None & Unknown	3	1.6	5	2.7	5	11.1	2	4.4
OAC Alone	159	85.5	155	83.3	30	66.7	28	62.2
Antiplatelet Alone	10	5.4	9	4.8	2	4.4	2	4.4
OAC + Antiplatelet	8	4.3	9	4.8	5	11.1	5	11.1
Others[a]	6	3.2	8	4.3	3	6.7	8	17.8
Total	***186***	***100.0***	***186***	***100.0***	***45***	***100.0***	***45***	***100.0***

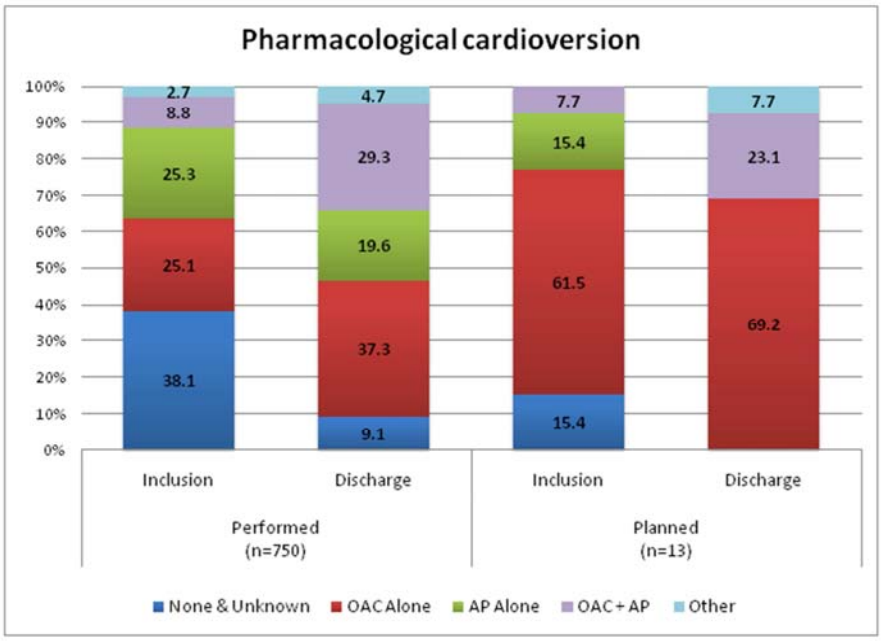
[a] Others include: OAC+Other ATT, AP+Other ATT, OAC+AP+Other ATT and Other ATT (Fondaparinux, LMW heparin, UF heparin, Other).

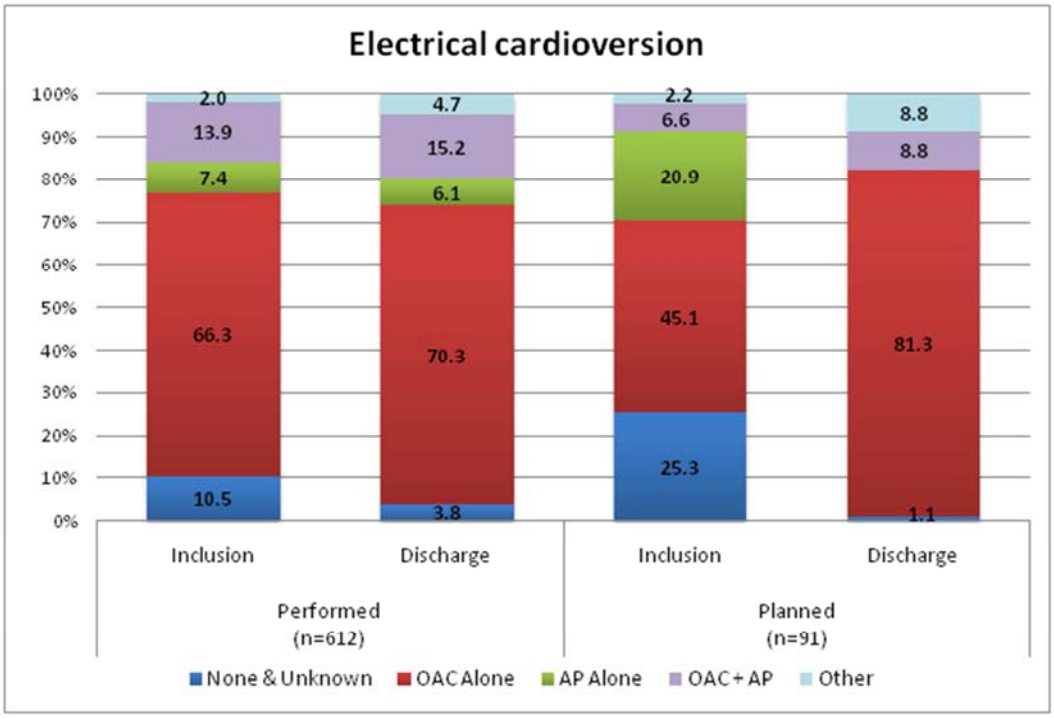
(b) VKA or NOAC use												
	Performed						Planned					
	Inclusion (N)			Discharge (N)			Inclusion (N)			Discharge (N)		
	VKA	NOAC	Total	VKA	NOAC	Total	VKA	NOAC	Total	VKA	NOAC	Total
OAC Alone	141	18	159	138	17	155	27	3	30	24	4	28
OAC + Antiplatelet	6	2	8	6	3	9	4	1	5	5	0	5
OAC + Others[b]	3	0	3	4	0	4	0	0	0	5	0	5
Total	***150***	***20***	***170***	***148***	***20***	***168***	***31***	***4***	***35***	***34***	***4***	***38***

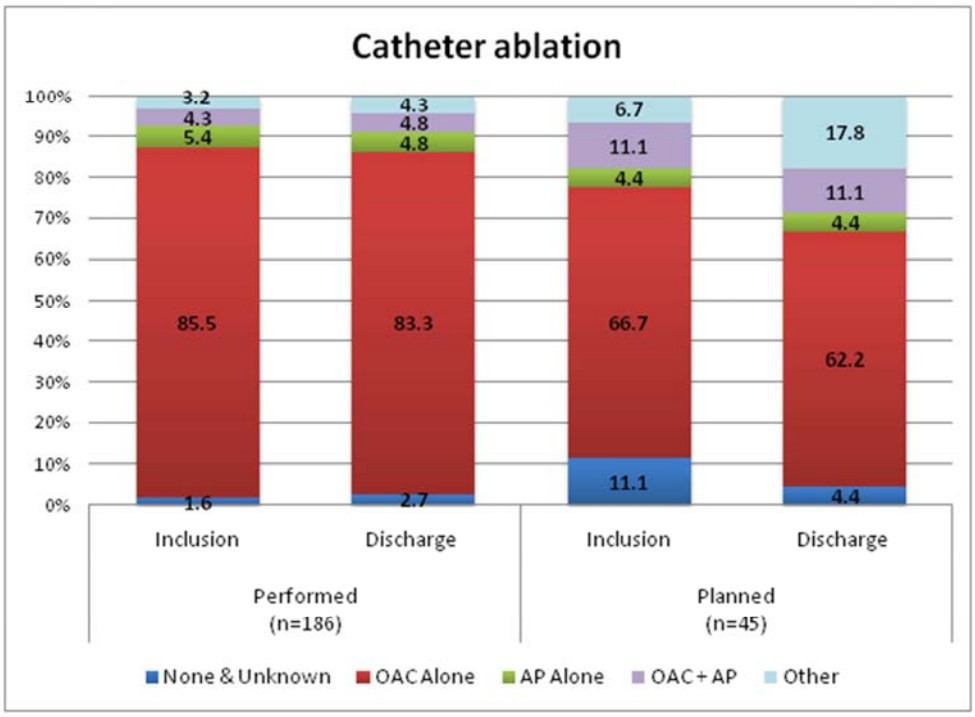
[b] Others include: OAC+Other ATT and OAC+AP+Other ATT

Figure 1

Antithrombotic drug prescription at inclusion and at discharge when the following interventions were either performed at the time of the survey or planned at discharge: (A) Pharmacological cardioversion, (B) Electrical cardioversion or (C) catheter ablation







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Clinical significance

- The EuroObservational Research Programme on Atrial Fibrillation(EORP-AF) Pilot survey provides contemporary data on oral anticoagulation prescribing by European cardiologists.
- Where oral anticoagulation was used, the majority were prescribed Vitamin K Antagonists(72.2%). Novel oral anticoagulants were used in the minority(7.7%). Also, 80.5% with a CHA_2DS_2-VASc score of ≥1 received oral anticoagulation.
- Antiplatelet therapy is still over-prescribed, with or without oral anticoagulation, whilst elderly patients were commonly undertreated with oral anticoagulation.

[70 words]

ACCEPTED MANUSCRIPT