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A population screening programme for atrial fibrillation: a report from the Belgian Heart Rhythm Week screening programme

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Aims Despite the increased prevalence of atrial fibrillation (AF), data for the implementation of nationwide screening programmes are limited. The aim of this national screening study was to increase nationwide awareness about AF and stroke risk, to determine the prevalence of AF in Belgian general population using an ECG handheld machine and its feasibility to identify new AF cases.

Methods and results We analysed data obtained from 5 years of the 'Belgian Heart Rhythm Week' screening programme. All subjects were screened using a one-lead ECG handheld machine. Among 65 747 subjects screened, AF was recorded in 911, with an overall prevalence of 1.4% [95% confidence interval (CI) 1.2–1.6%]. High thrombo-embolic risk, as assessed by CHA_2DS_2-VASc score ≥ 2, was recorded in 69% of AF subjects. In subjects with high thrombo-embolic risk, only 5.4% were treated with oral anticoagulant (OAC) and 5.8% were treated with OAC and antiplatelet drugs. Among recorded AF cases, the use of the ECG handheld machine allowed identification of 603 new AF patients (1.1%, 95% CI 0.9–1.3%). Factors associated with incident AF were chronic heart failure ($P < 0.001$), age ($P < 0.001$), diabetes mellitus ($P < 0.001$), previous stroke ($P < 0.001$), vascular disease ($P < 0.001$), and male sex ($P < 0.001$).

Conclusion In this Belgian national screening programme, prevalence of AF was 1.4%. The use of an ECG handheld machine is feasible to identify a significant number of new AF cases, most with a high thrombo-embolic risk. Given the low OAC use recorded, greater efforts in AF detection and treatment are urgently needed to reduce the burden of stroke associated with this common arrhythmia.

Keywords Atrial fibrillation • Prevalence • Screening • Risk factors

Introduction

The prevalence of atrial fibrillation (AF) is progressively increasing and in the USA, has been estimated to reach up to 12 million patients in 2050.[1] Despite this, up to 40% of AF patients remain asymptomatic and undiagnosed, exposing such patients to the risks of AF such as stroke and heart failure.[2,3] A recent systematic review exploring the issue of post-stroke AF diagnosis found that up to 16.9% of patients with a cryptogenic stroke are diagnosed with AF in one of the post-stroke phases, both early and late ones, with an overall 23.7% of patients diagnosed after the occurrence of stroke.[4]

The development of screening strategies for early detection of AF could be a solution, especially since opportunistic screening for AF in all patients aged ≥ 65 is recommended in guidelines.[5] One

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What's new?

- Systematic community screening programmes based on simple use of an ECG handheld machine is feasible to identify a significant number of new AF cases, most with a high risk of stroke and thrombo-embolism.
- Given the low use of OAC among recorded AF patients, greater screening efforts for AF detection are urgently needed to reduce the burden of stroke associated with this common arrhythmia.

consideration is to choose between a systematic or opportunistic approach to screening.[6] In a large systematic review, a similar high percentage of AF cases could be diagnosed in both screening approaches, in particular among patients aged 65 and more.[6] One large randomized controlled trial demonstrated that opportunistic screening could be more cost-effective than a systematic approach to screening.[7]

One possible advance in the development of effective systematic screening programmes could be the use of innovative new technologies to detect AF.[6,8] One recent study explored the possibility to detect AF using an iPhone one-lead ECG probe.[9] This study (SEARCH-AF) demonstrated that using this highly technological system, coupled with an automated interpretation system, could obtain high levels of both sensitivity and specificity in detecting AF, with an improvement in cost-effectiveness and treatment adherence.[9]

The aim of this national screening study was to determine the prevalence of AF in Belgium using a one-lead ECG handheld machine (Omron® HeartScan HCG-801, Colin, Australia) on a population screened during 5 years of the 'Belgian Heart Rhythm Week' screening programme.[10] Secondly, we evaluated AF-related thrombo-embolic risk in our screened population. Lastly, we assessed clinical factors associated with incident AF diagnosis.

Methods

Study design

As previously reported, the 'Belgian Heart Rhythm Week' is a Belgian national campaign on awareness about cardiac arrhythmias, designed along with an untargeted voluntary screening programme organized by the Belgian Hearth Rhythm Association (BeHRA) held 1 week a year from 2010 to 2014.[10] All adult (age $\geq$18 years) subjects were invited, on a voluntarily basis, to participate in a free screening programme in 89 national hospitals in Belgium. During every year edition of the 'Belgian Heart Rhythm Week' in all the country, the screening campaign was advertised through press conferences, a massive media campaign on the national radio, newspapers, and magazines, and via the distribution of flyers and posters in all national hospitals and general practitioner services.

The study protocol was approved by the Ethics Committee of all participating medical centres and each patient signed an informed consent form before participating. The National Government was consulted regarding the privacy law on the data collection. The study was conducted in accordance with the EU Note for Guidance on Good Clinical Practice CPMP/ECH/135/95 and the Declaration of Helsinki.

None of the subjects that took part in the programme was ever previously identified or selected as eligible for taking part. All the subjects reached one of the hospital in which the programme took part by themselves or were randomly picked among those people incidentally present in the hospitals. It was clearly stated that taking part in the programme would have not implied a free consultation with a cardiologist.

All subjects filled out a questionnaire to collect demographic variables (sex and age), any prior diagnosis of AF, the presence of the various risk factors evaluated computing the CHA_2DS_2-VASc[11] thrombo-embolic risk evaluation score. From 2012 to 2014, data on antithrombotic therapies were also collected. Every subject then underwent a 30 s one-lead ECG recording with an ECG handheld machine (Omron®, HeartScan HCG-801), that was previously validated and compared with a standard ECG as highly accurate to detect ECG changes and established arrhythmias, in particular the presence of AF.[12] All the procedures were nurse-led.

The presence of AF was defined as follows: (i) the surface ECG shows 'absolutely' irregular RR intervals, (ii) there are no distinct *P* waves on the surface ECG, and (iii) the atrial cycle length (when visible), i.e. the interval between two atrial activations, is usually variable and $<$200 ms ($>$300 bpm). Whenever the device detected the presence of AF, according to the criteria defined above, the ECG strip was checked by the on-site cardiologist for confirmation. Whether the ECG was unclear a 12-lead standard ECG was taken as soon as possible to confirm the presence of AF. Participants with diagnosed AF during the screening (AF group) were referred to consult their general practitioner or cardiologist.

Thrombo-embolic risk was categorized according to the CHA_2DS_2-VASc score.[11] 'Low-risk' patients were defined as males and females with no other risk factors for stroke (i.e. a CHA_2DS_2-VASc = 0 in males, or 1 in females); 'moderate risk' was defined as male patients with CHA_2DS_2-VASc = 1; 'high risk' as CHA_2DS_2-VASc score $\geq$2.[11]

Statistical analysis

All continuous variables were tested for normality with the Shapiro–Wilk test. Variables with normal distribution were expressed as means and standard deviations (SD), and tested for differences with the Student's *t*-test. Non-normal variables were expressed as median and interquartile range (IQR) and differences tested with the Mann–Whitney *U* test. Categorical variables, expressed as counts and percentages, were analysed by a χ^2 test.

A regression analysis was performed, after excluding all the subjects with previous AF, to establish clinical factors significantly associated with an incident AF diagnosis. All variables that were significantly different between the two groups at the baseline underwent a univariate analysis and those univariate predictors with a statistical significance of $<$10% were inserted into a forward multivariate logistic model. A two-sided *P*-value $<$0.05 was considered as statistically significant. All analyses were performed using SPSS v. 22.0 (IBM, NY, USA).

Results

Among the 82 569 subjects enrolled in the screening programme from 2010 to 2014, all subjects aged $\geq$20 with complete data about demographic characteristics and clinical risk factors were selected, obtaining a total of 65 747 selected subjects available for the present analysis (*Figure 1*). Median age was 58 years [48–66 IQR], and 58.6% (n = 38 548) were female.

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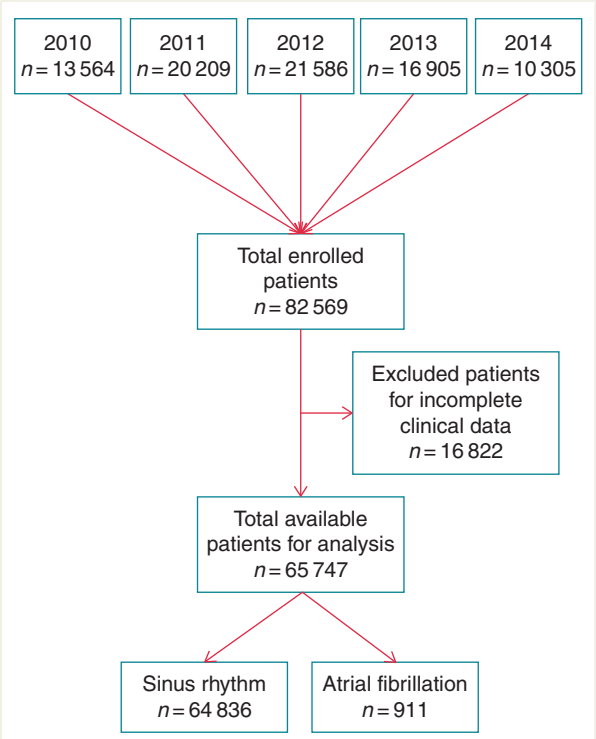

Figure 1 Study flow chart for subjects' selection.

Atrial fibrillation prevalence and clinical characteristics

Of the selected cohort, AF was recorded in 911 subjects with a prevalence of 1.4% [95% confidence interval (CI) 1.2–1.6%], being higher in males (1.8%) than in females (1.1%). In subjects with age ≥65, AF prevalence was 2.3%, compared with 1.0% in those aged <65. The prevalence of AF was 6.5% in the 85–89 years age strata. Male subjects had a significantly higher AF prevalence than females between 30 and 34 years ($P < 0.05$) and in the age strata 65–69, 70–74, 75–79, and 80–84 years ($P < 0.05$). Prevalence of AF diagnosis according to age and gender is shown in *Figure 2*.

Demographic and clinical characteristics of the AF and sinus rhythm screened populations are summarized in *Table 1*. Subjects with AF were older and more likely to be males, compared with subjects with sinus rhythm ($P < 0.001$). Subjects with AF had a higher prevalence of congestive heart failure (CHF), diabetes, stroke, and vascular disease than subjects with sinus rhythm (all $P < 0.001$). Thrombo-embolic risk as measured by the CHA_2DS_2-VASc score was higher in subjects with AF compared with subjects with sinus rhythm ($P < 0.001$).

CHA_2DS_2-VASc score and distribution of risk factors

Among the 911 subjects with AF, *low-risk patients* (i.e. CHA_2DS_2-VASc score 0 in males or CHA_2DS_2-VASc score 1 in females) was found in 78 (8.6%) males and in 103 (11.3%) females, respectively.

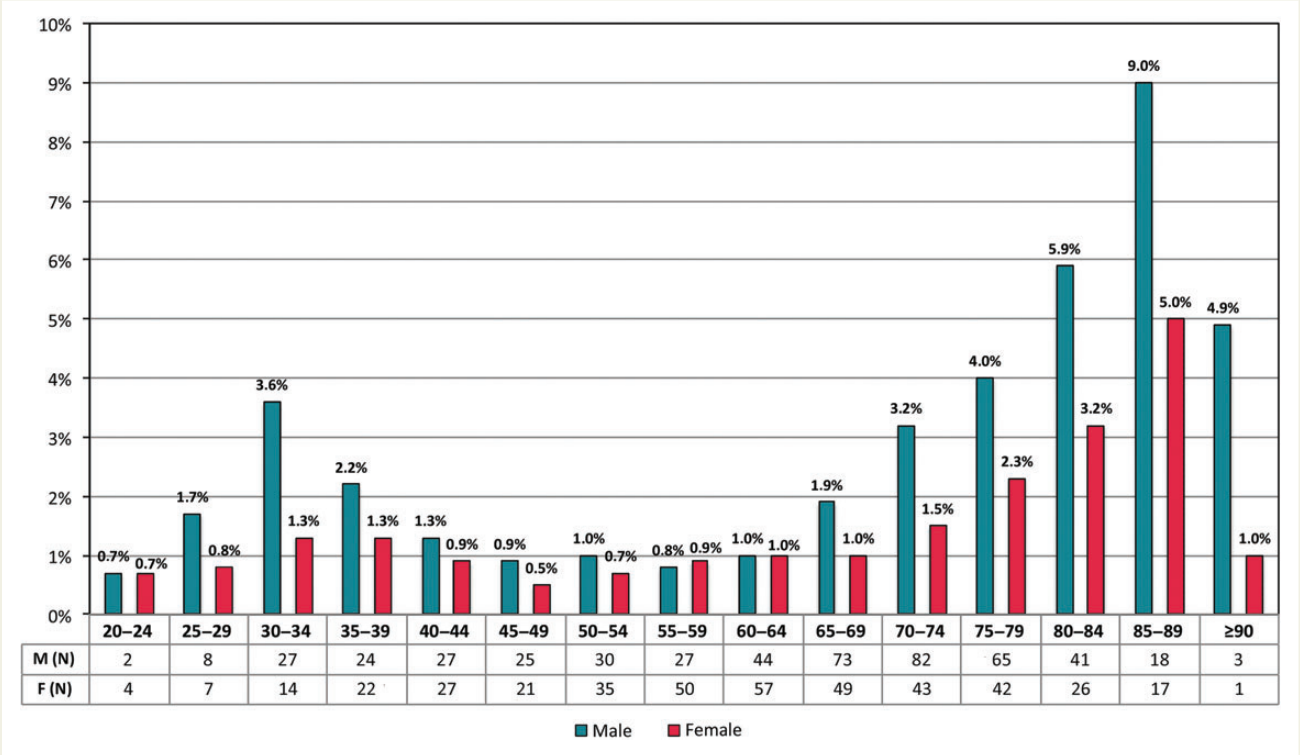

Figure 2 Prevalence of AF in the overall population according to gender and age. M, males; F, females.

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Table 1 Demographic and clinical characteristics distribution

	Sinus rhythm ($n = 64\,836$)	Atrial fibrillation ($n = 911$)	*P*-value
Age, years (median [IQR])	58 [48–66]	65 [51–74]	<0.001[a]
Age class			<0.001[b]
<65 years, *n* (%)	45 275 (69.8)	451 (49.5)	<0.05[c]
65–74 years, *n* (%)	14 100 (21.7)	247 (27.1)	<0.05[c]
≥75 years, *n* (%)	5461 (8.4)	213 (23.4)	<0.05[c]
Heart rate[d], bpm (median [IQR])	78 [69–88]	78 [68–92]	0.593[a]
Sex category			<0.001[b]
Male, *n* (%)	26 703 (41.2)	496 (54.4)	
Female, *n* (%)	38 133 (58.8)	415 (45.6)	
Congestive heart failure, *n* (%)	13 019 (20.1)	289 (31.7)	<0.001[b]
Hypertension, *n* (%)	23 477 (36.2)	353 (38.7)	0.113[b]
Diabetes, *n* (%)	13 802 (21.3)	244 (26.8)	<0.001[b]
Stroke, *n* (%)	12 712 (19.6)	244 (26.8)	<0.001[b]
Vascular disease, *n* (%)	14 906 (23.0)	280 (30.7)	<0.001[b]
Previous AF diagnosis, *n* (%)	12 698 (19.6)	308 (33.8)	<0.001[b]
CHA_2DS_2-VASc, median [IQR]	2 [1–3]	3 [1–5]	<0.001[a]

AF, atrial fibrillation; IQR, interquartile range.
[a]Mann–Whitney *U* test.
[b]χ^2 test.
[c]Bonferroni correction.
[d]Data about 53 406 subjects.

Table 2 Demographic and clinical characteristics distribution of AF subjects according to the presence of previous AF

	Previous AF ($n = 308$)	Incident AF ($n = 603$)	*P*-value
Age, years (median [IQR])	65 [45–76]	65 [52–73]	0.982
Age class			0.002
<65 years, *n* (%)	152 (49.4)	299 (49.6)	NS[a]
65–74 years, *n* (%)	66 (21.4)	181 (30.0)	<0.05[a]
≥75 years, *n* (%)	90 (29.2)	123 (20.4)	<0.05[a]
Heart rate[b], bpm (median [IQR])	77 [68–91]	78 [68–92]	0.200
Sex category			0.922
Male, *n* (%)	167 (54.2)	329 (54.6)	
Female, *n* (%)	141 (45.8)	274 (45.4)	
Congestive heart failure, *n* (%)	219 (71.1)	70 (11.6)	<0.001
Hypertension, *n* (%)	162 (52.6)	191 (31.7)	<0.001
Diabetes, *n* (%)	154 (50.0)	90 (14.9)	<0.001
Stroke, *n* (%)	169 (54.9)	75 (12.4)	<0.001
Vascular disease, *n* (%)	176 (57.1)	104 (17.2)	<0.001
CHA_2DS_2-VASc, median [IQR]	5 [3–6]	2 [1–3]	<0.001
CHA_2DS_2-VASc risk classes			<0.001
Low, *n* (%)	9 (2.9)	172 (28.5)	<0.05[a]
Intermediate, *n* (%)	17 (5.5)	84 (13.9)	<0.05[a]
High, *n* (%)	282 (91.6)	347 (57.5)	<0.05[a]

AF, atrial fibrillation; IQR, interquartile range; NS, non-significant.
[a]Bonferroni correction.
[b]Data about 51 489 subjects.

CHA_2DS_2-VASc score equal to 1 was found in 101 males (11.1%). High thrombo-embolic risk, defined as CHA_2DS_2-VASc ≥2, was recorded in 69.0% ($n = 629$) of the subjects.

In male subjects with CHA_2DS_2-VASc 1, age 65–74 category was the most common risk factor (67.3%). Hypertension was recorded in 18.8%, while CHF in 9.9%. Only 2% of these patients reported vascular disease. In subjects at high thrombo-embolic risk (CHA_2DS_2-VASc ≥2), the most prevalent risk factors were hypertension (53.1%) and vascular disease (44.2%).

Clinical predictors of incident AF

From the questionnaire answers, a total of 13 006 subjects, i.e. 19.8% of the overall analysed population, were found to have reported a previous diagnosis of AF. In order to analyse clinical factors associated with the occurrence of a 'new-onset' incident AF, these patients were excluded, leaving 52 741 subjects available for this analysis. Of these, 603 subjects (1.1%, 95% CI 0.9–1.1%) had incident AF, from the total of 911 AF subjects. Compared with the 308 patients with previous AF (*Table 2*), patients with incident AF had less prevalent hypertension, diabetes, CHF, stroke, and vascular disease (all $P < 0.001$). Patients with previous AF were more commonly aged 65–74 and ≥75 ($P = 0.002$), and thus, higher thrombo-embolic risk ($P < 0.001$).

On multivariable logistic regression analysis for incident AF, the final forward model demonstrated that CHF ($P < 0.001$), age 65–74 ($P < 0.001$) and age ≥75 ($P < 0.001$), diabetes ($P < 0.001$), previous stroke ($P < 0.001$), previous diagnosis of vascular disease ($P < 0.001$), and sex (i.e. male) category ($P < 0.001$) were significantly associated with incident AF (*Table 3*).

Table 3 Multivariable logistic analysis for incident AF diagnosis

	Multivariable model			
	β	OR	CI	*P*-value
Congestive heart failure	0.509	1.66	1.25–2.22	0.001
Age class				<0.001
<65 years (ref)	–	–	–	–
65–74 years	0.559	1.75	1.45–2.11	<0.001
≥75 years	1.710	3.22	2.60–4.00	<0.001
Diabetes	0.440	1.55	1.22–1.99	<0.001
Stroke	0.736	2.09	1.58–2.76	<0.001
Vascular disease	0.297	1.35	1.06–1.71	0.015
Sex category (male)	0.418	1.54	1.30–1.81	<0.001

CI, confidence interval; ref, reference group; OR, odds ratio.

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Antithrombotic therapy

Concomitant antithrombotic therapy was recorded only for subjects enrolled from 2012 to 2014. This enrolled population comprised 38 434 subjects, and of these, 417 (1.1%, 95% CI 0.9–1.3%) of the total of 911 AF subjects, were found to be in AF.

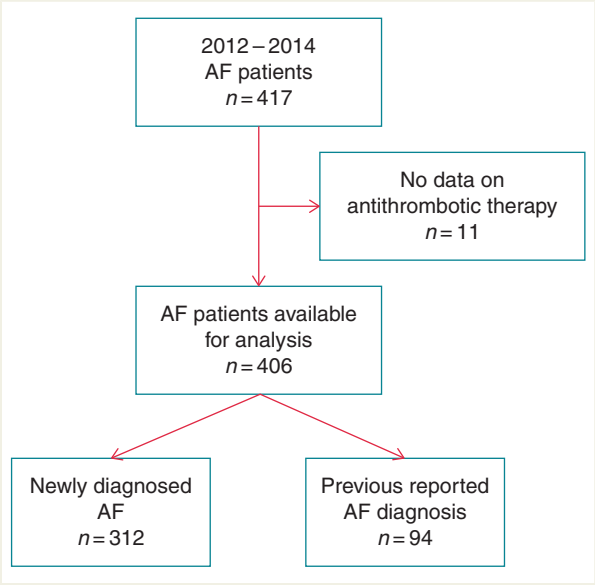

Figure 3 Flow-chart for patients with available data about antithrombotic therapy.

Clinical characteristics for this AF cohort were similar to that reported in the overall study population, except for hypertension that was significantly more prevalent in AF subjects compared with those in sinus rhythm (38.4 vs. 28.7%, $P < 0.001$). Diabetes mellitus prevalence was lower in this cohort (7.0%) compared with the overall study population; however, AF subjects were more commonly diabetic compared with subjects with sinus rhythm (9.8 vs. 6.8%, $P = 0.017$). The proportion at high thrombo-embolic risk was similar to that reported for the overall AF cohort, that is, 268 (64.3%) of AF subjects.

Data on antithrombotic therapies (available for 406 out of 417 AF subjects) (*Figure 3*) are reported in *Table 4*. Among the AF subjects with high thrombo-embolic risk, only 5.4% (14 subjects) were treated with oral anticoagulant (OAC) monotherapy and 5.8% (15 subjects) were treated with both OAC and antiplatelet drugs. In the group of subjects with *newly diagnosed* AF ($n = 318$ subjects) only 4 (1.3%) were treated with OAC alone and 2 (0.6%) were treated with antiplatelet drugs and OAC. Of the subjects with *previous reported AF diagnosis* ($n = 94$ subjects, 23.2%), OAC monotherapy was used in only 14 (14.9%), and antiplatelet plus OAC was used in 13 (13.8%) subjects.

Discussion

In this study, we describe for the first time Belgian AF prevalence among unselected adult population, based on a national screening study performed 1 week a year from 2010 to 2014, as part of the 'Belgian Heart Rhythm Week'[10] Second, we show how a systematic screening with a handheld ECG is capable to diagnose a large number of incident AF cases. Last, we report clinical factors associated

Table 4 Antithrombotic therapy distribution according to thrombo-embolic risk category in AF subjects from the 2012–2014 cohort

All subjects ($n = 406$)	**Low risk ($n = 89$)**	**Intermediate risk ($n = 57$)**	**High risk ($n = 260$)**	***P*-value***
Antithrombotic therapy, *n* (%)				0.006
None therapy	88 (98.9)	51 (89.5)	216 (83.1)	
Antiplatelets only	0 (0)	3 (5.3)	15 (5.8)	
Oral anticoagulant only	1 (1.1)	3 (5.3)	14 (5.4)	
Antiplatelets and oral anticoagulant	0 (0)	0 (0)	15 (5.8)	
Previous AF ($n = 94$)	**Low risk ($n = 5$)**	**Intermediate risk ($n = 9$)**	**High risk ($n = 80$)**	***P*-value***
Antithrombotic therapy, *n* (%)				0.301
None therapy	5 (100)	6 (66.7)	50 (62.5)	
Antiplatelets only	0 (0)	0 (0)	6 (7.5)	
Oral anticoagulant only	0 (0)	3 (33.3)	11 (13.8)	
Antiplatelets and oral anticoagulant	0 (0)	0 (0)	13 (16.2)	
Incident AF ($n = 312$)	**Low risk ($n = 84$)**	**Intermediate risk ($n = 48$)**	**High risk ($n = 180$)**	***P*-value***
Antithrombotic therapy, *n* (%)				0.309
None therapy	83 (98.8)	45 (93.8)	166 (92.2)	
Antiplatelets only	0 (0)	3 (6.2)	9 (5.0)	
Oral anticoagulant only	1 (1.2)	0 (0)	3 (1.7)	
Antiplatelets and oral anticoagulant	0 (0)	0 (0)	2 (1.1)	

AF, atrial fibrillation.
**P*-value is about differences in distribution of antithrombotic therapy across the different thrombo-embolic risk categories.

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with the occurrence of incident AF and the suboptimal use of OAC in this simple nationwide community based programme that is executed 1 week per year.

Overall, AF prevalence recorded in Belgium was similar to previously reported prevalence rates.[13] In keeping with prior studies, we show a higher prevalence rate in male than in female subjects and among older subjects.[14–16] Of note, our study documented a high peak of prevalence in 30–34 years age strata differently from which previously reported, even if the unexpected higher prevalence of AF could be due to the small number of subjects in those age strata. Conversely, also the presence of other concomitant reversible trigger factors (e.g. alcohol abuse, obesity, intense physical activity) could possibly explain this unusual incidence peak. Compared with the EORP-AF Pilot Study,[17] we found a higher proportion of 'low-risk' subjects, while subjects with high thrombo-embolic risk was less represented in our cohort than in the EORP-AF patient.[17,18] Nevertheless, this difference in proportion of 'high-risk' subjects could reflect the different setting of the studies. Indeed, our data come from a large community-based screening, while EORP-AF was based on cardiologist-centred services. In this context, our data are an important representation of thrombo-embolic risk in the 'real-life' general AF population.

As emphasized in guidelines, trying to identify AF before the occurrence of major complications is an important objective.[5] The ESC guidelines recommend that every subject aged 65 or older be part of opportunistic screening by pulse palpation and confirming AF using a 12-leads ECG,[5] as based on how the SAFE study was performed.[19] The latter showed that opportunistic screening in subjects at 65 years old or above was able to identify up to around 1.6% with a new AF diagnosis. More recently, the SEARCH-AF study identified new AF cases using an iPhone one-lead ECG probe identifying AF in 1.5% of the study cohort in community-based pharmacies.[9] Moreover, the economic analysis showed that using technological devices to identify AF through a systematic community-screening programme was feasible and cost-effective.

Furthermore, our results reinforce the concept that even in elderly patients systematic screening procedures are able to detect a significant number of patients with untreated AF. Indeed, very recent data coming from the STROKESTOP study showed that in an unselected population of patients aged 75–76, a previously undetected AF diagnosis was posed in 3.0% of the studied cohort,[20] similar to the data reported in our 75–79 age stratum population (3.1%).

Our data reinforces the possibility of using new technological devices to plan large systematic and untargeted screening programmes. Indeed, the use of a low-cost technological device could help in the implementation of systematic screening, and measures to implement stroke prevention in all high risk patients. This would have an impact of reducing incident stroke due to asymptomatic AF, which would lead to a significant saving in terms of quality of life[21] and health-related costs.[1]

Our data strengthen the need for national screening programmes for AF in European countries, to accomplish identifying AF patients (often asymptomatic) early, prior to their presentation with complications such as stroke and heart failure.[5] Despite evidence supporting their cost effectiveness, nationwide AF screening programmes have not been uniformly approved, for example, as seen in the UK (http://legacy.screening.nhs.uk/atrialfibrillation).

Clinical factors significantly associated to the diagnosis of incident AF were similar to those previously described for AF epidemiology,[13,14] with the strongest associations seen for older age and previous stroke. Based on this study, there could be a role of ECG handheld machines in screening both the general population and selected cohorts, in relation to concomitant AF risk factors.

Our data again emphasize how in the general population, the proportion of AF subjects correctly treated with OAC accordingly to current guidelines seems suboptimal.[5] Moreover, we clearly show the large proportion of newly diagnosed AF patients at high thrombo-embolic risk where OAC therapy would have been recommended.[5] The issue of the OAC under-treatment has always been an important problem in the management of AF patients, as evident by several studies.[22,23] However, recent data from the EORP-AF General Pilot Registry documented a high proportion (~80%) of cardiologist-managed AF patients adhering to international guidelines for stroke prevention.[17] The low number of subjects treated with OAC in our study seems to underline the gap between highly controlled and selected populations from randomized controlled trials or those managed by highly specialized cardiology-based centres, to community-based observational cohort studies and the 'real-life' clinical application of guidelines.

Moreover, other possible explanations could be related to physicians' practice. On one side could be the physician's unawareness about the most updated international guidelines on the other there is the possible concern about bleeding risk when using OAC treatment. Indeed, also data coming from the EORP-AF population showed that a large part of patients, more than 17%, were undertreated according to their thrombo-embolic risk.[24] Indeed, some evidence seem to suggest that among physicians major bleeding concern seems to overcome that of a thrombo-embolic event, being the most feared consequence when treating AF patients.[25,26] Furthermore, at the moment no Belgian national guidelines about AF treatment have been produced, so some physicians, in particular general practitioners, are unaware about the need of a proper OAC therapy in some of their patients.

Moving from our study results, it appears clear that a massive national campaign would be designed to better inform all the physicians, both specialists and general practitioners, about the most updated guidelines in evaluating and treating AF patients. In particular, all of the physicians should be aware about the most reliable tools in evaluating patients thrombo-embolic and bleeding risk (CHA_2DS_2-VASc and HAS-BLED scores), in order to correctly identify those patients that needed both OAC therapy and specific interventions to reduce the bleeding risk (i.e. better control of blood pressure, control of alcohol use, and inadequate use of antiplatelet and anti-inflammatory drugs),[11] especially given the recent evidence that both patients under- and over-treated with OAC have a higher risk of major thrombo-embolic events.[24] Similarly, all the physicians should be aware about the need of identifying those patients that were more likely to have a better anticoagulation control and those that were not (using the SAMe-TT_2R_2 score) to take the most valuable decision if to prescribe a vitamin K antagonist or a non-vitamin K antagonist oral anticoagulants.[11,27] In this sense, the drafting of National Guidelines

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about AF diagnosis, clinical evaluation, and treatment could be a valuable option.

Limitations

One of the major limitations of our study is the voluntarily nature of the screening programme. This could have led to an underestimation of both overall and incident AF prevalence. Secondly, the study questionnaire was designed only to identify the major thrombo-embolic risk factors (currently used to calculate the CHA_2DS_2-VASc score) and did not record any other clinical factors that could influence AF incidence. Moreover, having the subjects filling the questionnaire independently may have led to some clinical questions being misunderstood. Indeed, the self-reported previous AF diagnosis data could have been affected by reporting bias that could not be addressed by medical monitoring. Furthermore, when the use of APT and/or OAC was reported, this was not uniquely related to the presence of AF, even in those subjects that reported a previous AF diagnosis.

Conclusions

In a national population screening programme, the prevalence of AF was 1.4% in the Belgium population. The use of an ECG handheld machine is feasible to identify a significant number of new AF cases, most with a high risk of stroke and thrombo-embolism. Given the low use of OAC among recorded AF patients, greater efforts in AF detection and treatment are urgently needed to reduce the burden of stroke associated with this common arrhythmia.

Supplementary material

Supplementary material is available at *Europace* online.

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Missing ventricular paced events at hourly plus 30-s intervals

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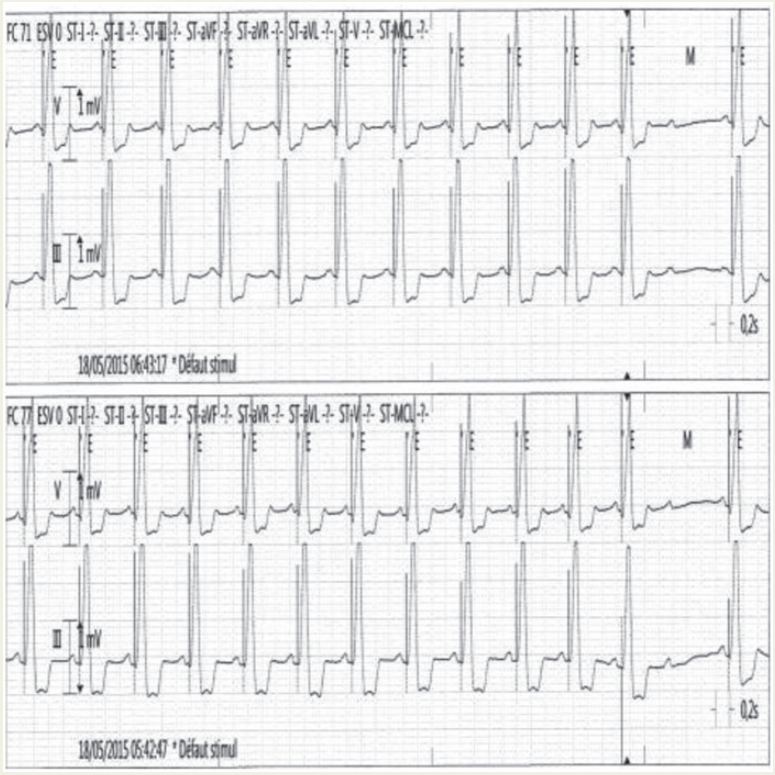
Permanent pacemakers are often implanted after surgical aortic valve replacement. The proper pacemaker function is usually confirmed by electrocardiographic monitoring before discharge of the patient from the hospital. A 31-year-old Caucasian man who underwent a Bentall procedure received an Advisa® dual-chamber pacemaker (Medtronic Inc., Minneapolis, MN, USA) programmed in DDD mode for complete atrioventricular block.

Analysis of the telemetry recordings revealed the absence of single ventricular paced events at 60 min plus 30 s intervals (*Figure*). Upon interrogation, the pacemaker was in DDD pacing mode, with atrial sensed–ventricular paced (AS–VP) events, and no abnormal event stored in memory.



The missing V-Pace is caused by residual electrical disturbance on the ventricular sense while referencing electrogram. Following an AS, there was no ventricular blanking, a false ventricular sense occurred with no VP.

This phenomenon, which has been observed with various Medtronic dual-chamber pacemakers (the Advisa® model in particular), might be manageable by decreasing the ventricular sensitivity. This phenomenon, limited to dual-chamber pacemakers, seems to be rare and should not prompt an explant of the device.

The full-length version of this report can be viewed at: http://www.escardio.org/Guidelines-&-Education/E-learning/Clinical-cases/Electrophysiology/EP-Case-Reports.

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