Patients' attitude and knowledge about oral anticoagulation therapy: results of a self-assessment survey in patients with atrial fibrillation conducted by the European Heart Rhythm Association

Walid Amara[1], Torben B. Larsen[2], Elena Sciaraffia[3], Antonio Hernández Madrid[4]*, Jian Chen[5,6], Heidi Estner[7], Derick Todd[8], Maria G. Bongiorni[9], Tatjana S. Potpara[10,11], Nikolaos Dagres[12], Pascal Sagnol[13], and Carina Blomstrom-Lundqvist[3]

[1]Department of Cardiology, Groupe Hospitalier Le Raincy-Montfermeil, Montfermeil, France; [2]Department of Cardiology, AF Studygroup, Aalborg University Hospital, Aalborg, Denmark; [3]Department of Cardiology, Institution of Medical Science, Uppsala University, Uppsala, Sweden; [4]Cardiology Department, Ramón y Cajal Hospital, Alcala University, 28034 Madrid, Spain; [5]Department of Heart Disease, Haukeland University Hospital, Bergen, Norway; [6]Department of Clinical Science, University of Bergen, Bergen, Norway; [7]Department of Cardiology, MedizinischeKlinik I, Ludwig-Maximilians-Universität, Campus Großhadern, Marchioninistrasse 15, München 81377, Germany; [8]Manchester Heart Centre, Manchester, UK; [9]2nd Cardiology Department, University Hospital of Pisa, Pisa, Italy; [10]School of Medicine, University of Belgrade, Belgrade, Serbia; [11]Cardiology Clinic, Clinical Center of Serbia, Belgrade, Serbia; [12]Second Cardiology Department, Attikon University Hospital, University of Athens, Athens, Greece; and [13]Cardioloy Department, Centre Hospitalier William Marey, 71100 Chalon s/Saone, France

The purpose of this European Heart Rhythm Association survey was to assess the attitude, level of education, and knowledge concerning oral anticoagulants (OACs) among patients with atrial fibrillation (AF) taking vitamin K antagonists (VKAs), non-VKA oral anticoagulants (NOACs) or antiplatelets. A total of 1147 patients with AF [mean age 66 ± 13 years, 529 (45%) women] from 8 selected European countries responded to this survey. The overall use of OACs and antiplatelets was 77 and 15.3%, respectively. Of the patients taking OACs, 67% were on VKAs, 33% on NOACs, and 17.9% on a combination of OACs and antiplatelets. Among patients on VKAs, 91% correctly stated the target international normalized ratio (INR) level. The proportion of patients on VKA medication who were aware that monthly INR monitoring was required for this treatment and the proportion of patients on NOAC who knew that renal function monitoring at least annually was mandatory for NOACs was 76 and 21%, respectively. An indirect estimation of compliance indicated that 14.5% of patients temporarily discontinued the treatment, and 26.5% of patients reported having missed at least one dose. The survey shows that there is room for improvement regarding education and adherence of patients taking OACs, particularly regarding monitoring requirements for NOACs.

Keywords   Atrial fibrillation • Stroke • Risk • Oral anticoagulants • Vitamin K antagonists • Non-vitamin K antagonist oral anticoagulants • Guidelines • CHA$_2$DS$_2$-VASc • Patient awareness • Survey

Introduction

Atrial fibrillation (AF), the most common cardiac arrhythmia in adults, is associated with significant morbidity and mortality, with the increased risk for thromboembolic stroke as the main concern. Since oral anticoagulant (OAC) therapy effectively reduces the risk for AF-related thromboembolic events, optimal management of OAC is of outmost importance.[1,2] Guidelines and recommendations on clinical practice are usually drawn from the results of multicentre trials, most of which are conducted in selected centres under special circumstances and often different from daily practice. The knowledge and attitude of the patients are, however, rarely represented in randomized clinical trials.

We conducted the European Heart Rhythm Association (EHRA) survey in order to assess the attitude, education, and knowledge in AF patients taking thromboembolic prophylaxis across Europe. This

---

* Corresponding author. Tel: +34 913369006; fax: +34 913368183. E-mail address: antoniomadri@gmail.com

is of particular interest since apart from conventional vitamin K antagonists (VKAs) alternative treatments with recently introduced non-VKA oral anticoagulants (NOACs) are available. By understanding the knowledge and educational levels among AF patients in Europe, this survey is expected to highlight the gaps between current recommendations and clinical practice and the areas of uncertainties.

Methods

This survey included patients diagnosed with AF, either recently or in the past. Patients taking anti-thrombotic drug therapy were invited to take part in the survey by answering the questionnaire. The topic of the survey and the questions were designed and approved by the members of the Scientific Initiatives Committee (SIC) in collaboration with the French National College of Cardiologists (CNCH). The content and format of the survey regarding understanding and ease of use were tested in advance in clinical practice in each of the participating countries in order to obviate misinterpretations by participating patients.

The survey was created on an electronic platform consisting of a questionnaire with 40 questions. It was a prospective, multicentre, and multinational survey in the patients' native language, available on Internet, and it was sent to the EHRA Electrophysiology (EP) research network centres. The countries invited to participate were the largest that did not require specific permission for participation and that had country coordinators in the SIC, including France, Denmark, Sweden, Spain, Norway, Germany, UK, and Italy. The survey was approved by regional ethics committee in Norway. The EP Network centres, which were invited to participate on a voluntary basis, were instructed to approach hospitals, outpatient clinics, and specific patient associations or organizations. As data were collected anonymously, via the online questionnaire, it was impossible to identify the patient. Each patient was asked to enter their individual data via the internet without any interference from medical staff. The study was conducted from 26 November 2014 to 28 February 2015. In this document, we report the results pertinent to patients' attitude and knowledge, while data focusing on educational level and the relation to the replies and geographical differences will be reported subsequently.

Statistical analysis

Values are expressed as mean $\pm$ standard deviation for continuous data and as counts and percentages for categorical data. Distributions of categorical data were examined by χ^2 test or Fisher's exact test, as appropriate. The analyses were performed using SPSS software for windows, version 19.0 (IBM Corporation, Armonk, NY, USA).

Results

Patient characteristics

A total of 1147 patients from 8 European countries participated in the survey. The numbers of patients from the different countries were as follows: 386 (33.6%) from France, 305 (26.6%) from Denmark, 240 (20.9%) from Sweden, 88 (7.7%) from Spain, 51 (4.5%) from Norway, 43 (3.7%) from Germany, 25 (2.2%) from the UK, and 9 (0.8%) patients from Italy. The mean age was 66 $\pm$ 13 years, and there were 618 men and 529 women. The self-reported body weight of the patients was 81.9 $\pm$ 23.9 kg. The patients were informed about the survey by their cardiologist in

Table 1 Patient characteristics and thromboembolic risk factors reported by the patients

Demographic and clinical characteristics	Number (%)
Mean age (range), years	66 (22–94)
Heart valve disease with artificial valve	85 (7.4)
Hypertension	600 (52.3)
Diabetes	178 (15.6)
History of stroke or TIA	144 (12.6)
Coronary artery disease	218 (19.0)
Arteriosclerosis excluding coronary artery disease	66 (5.6)
History of heart failure	476 (41.5)
CHA2DS2-VASc score >2	512 (44.6)
CHA2DS2-VASc score, mean (range)	2.9 (0–8)
Ongoing treatment with blood-thinning agents	879 (76.6)

Figures denote numbers and % in brackets unless otherwise stated.
TIA, transient ischaemic attack.

Table 2 Anticoagulant and antiplatelet therapy according to the patient survey

Anticoagulation and antiplatelet therapy	Number (%)
Present medication with blood-thinning agents	879 (76.6)
VKAs (warfarin, fluindione, acenocoumarol)	588 (66.9)
Non-VKAs	291 (33.1)
Dabigatran	125 (14.2)
Apixaban	78 (8.8)
Rivaroxaban	88 (10.0)
Antiplatelets[a]	175 (15.3)
Aspirin	149 (12.9)
Clopidogrel	42 (3.7)
Ticagrelor	9 (0.8)
Prasugrel	6 (0.5)

Figures denote numbers and % in brackets unless otherwise stated.
[a]Some patients received two antiplatelet agents.

36.1% of the cases, by their nurse in 17.2%, by a patient association in 12.6%, learned about the survey directly from the web in 31.8%, or from a friend or a family member in 2.3%. The patient's clinical history and CHA$_2$DS$_2$-VASc scores are provided in *Table 1*.

Anticoagulation and antiplatelet therapy

The survey included one question asking whether the patient was taking an ongoing blood-thinning medication and another one asking them to specify which of the blood-thinning agents the patient was taking from a list of OACs and antiplatelets (trade names specific for each country) (*Table 2*). A total of 879 (76.6%) patients were currently treated with an anticoagulant (VKA or NOAC), of whom 588 (66.9%) were on VKAs and 291 (33.1%) on NOACs (*Table 2*).

When patients were asked separately if they were treated with an OAC, 942 (82%) patients claimed that they were on therapy with

OACs. An antiplatelet medication was reported by 175 (15.3%) patients (*Table* 2). Of those on antiplatelet therapy, 87 were on an antiplatelet only, 62 on a combination of a VKA and an antiplatelet, and 26 on a combination of a NOAC and an antiplatelet.

When patients were asked about the purpose of their anticoagulation medication, the majority, 90.0%, had understood that the indication for anticoagulation therapy was to 'thin the blood', and 9.0% responded that the purpose was to treat an arrhythmia.

Among 998 patients with a CHA$_2$DS$_2$-VASc score of ≥ 2, there were 581 (58.2%) patients who replied that they were on a VKA, 288 (28.8%) on a NOAC, and 174 (17.4%) on an antiplatelet, while 27 (2.7%) patients were on a combination of an anticoagulant and an antiplatelet, whereas 129 (12.9%) were not receiving any OACs.

Monitoring of anticoagulation therapy

Patients were asked about blood testing to assess the effectiveness of the anticoagulation treatment, and among patients on VKAs, 76% reported having a blood test monthly (or more if necessary), 22% annually, and 2% claimed not needing any blood test. For those on VKAs, a total of 42% replied 'yes' to the question if they have ever changed the VKA dose themselves. When patients were asked about their INR targets while on VKA, 91% of patients reported that the target INR level was between 2 and 3, 3% that the target INR was <2, and 6% replied that the target INR was >3. Patients were also asked if their INR has ever exceeded the upper limit of the target level (*Figure* 1).

Among the 291 patients on NOACs, 87 (29.9%) patients declared not needing a blood monitoring and 47 (16.2%) did not know if the needed any; 84 (28.9%) reported needing a blood test annually and 73 (25.0%) on a monthly basis. Patients on NOACs were asked if they needed to have their renal and liver functions monitored and if they had to avoid some medications or be on a special diet, the summary of their replies is shown in *Figure* 2.
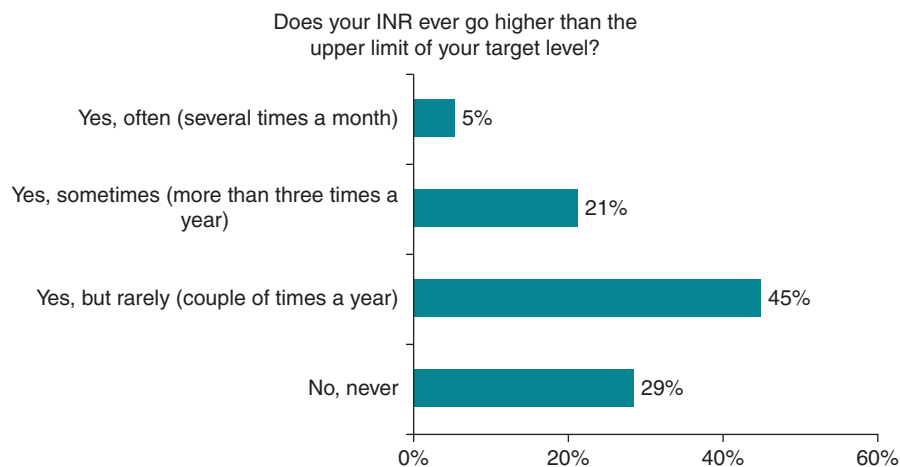

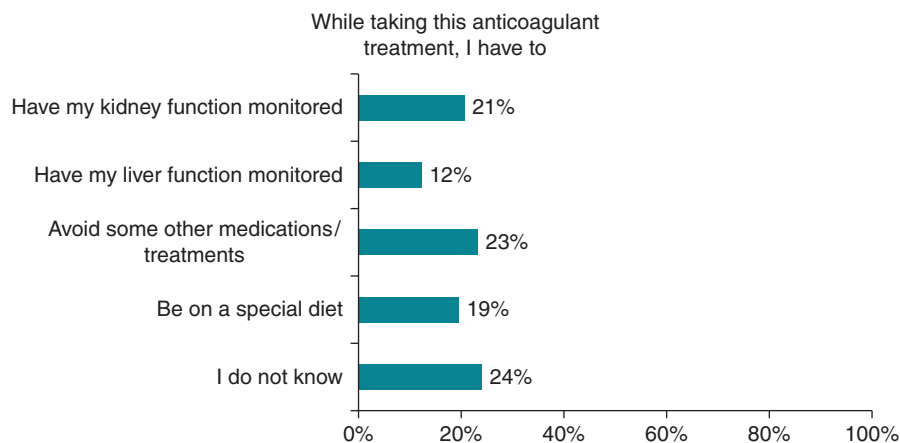**Figure 1** Frequency of INR higher than the upper limit of the target level. INR, international normalized ratio.
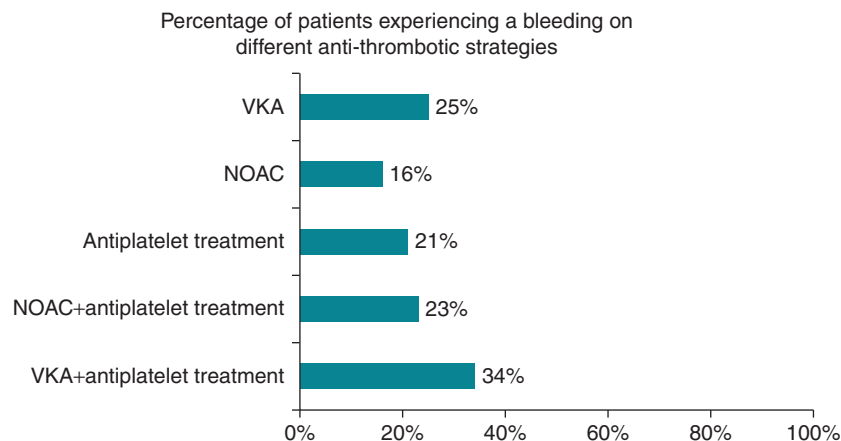

Figure 2 Monitoring on NOACs.

Figure 3 Patients with bleeding on different anti-thrombotic therapies.
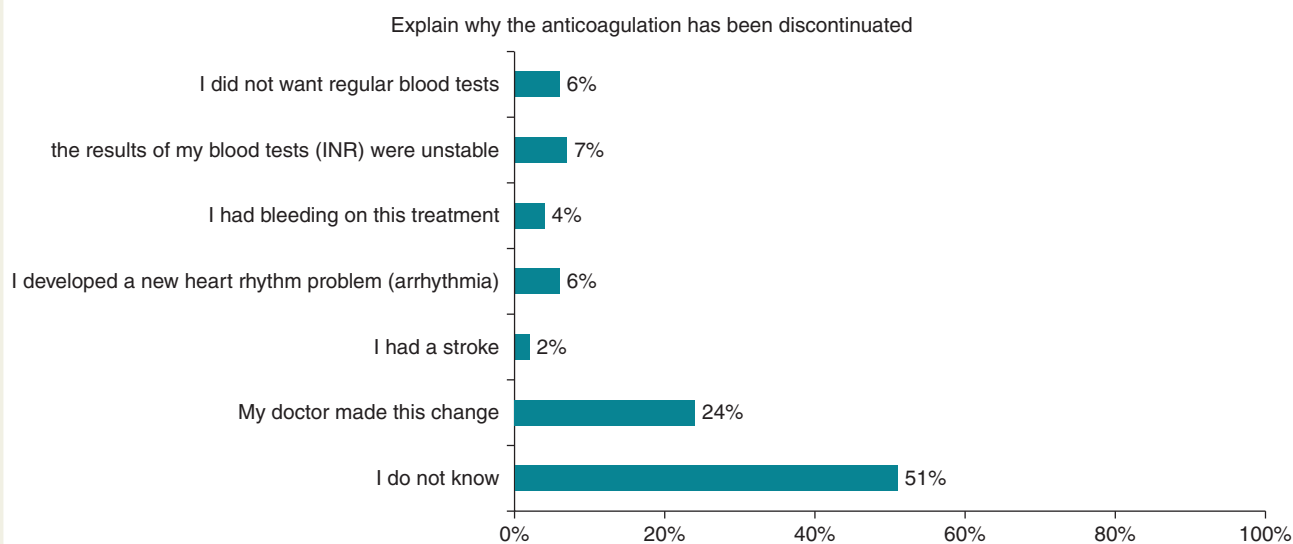

Figure 4 Reasons for anticoagulation discontinuation. INR, international normalized ratio.

Risk of bleeding

Patients were asked if anticoagulation therapy was associated with an increased risk of bleeding or not. A majority, 475 (54.0%) patients, replied that anticoagulation was associated with an increased risk of small bleeding, whereas 229 (26.1%) thought that it increased the risk of all bleeding (including major bleeding).

A history of bleeding was reported by 192 (13%) patients, and their experiences of bleedings (even a small bleeding) are presented in *Figure 3*. As shown, a history of bleeding was least common among patients on NOACs (16%) and most frequent (34%) in those on a combination of VKA and antiplatelet treatments (*Figure 3*).

Adherence

Discontinuation of OACs was reported by 14.5% of the participants; reasons are shown in *Figure 4*. A total of 26.6% replied that they had missed their intake of medication once or several times.

Discussion

This EP wire provides the insight into the current patient's knowledge, education, and compliance regarding the use of OACs in Europe. The latest European Society of Cardiology (ESC) guidelines on AF management[3] recommend OAC therapy in patients with a CHA_2DS_2-VASc score of 1 or more and favour NOACs over VKAs. However, in this survey, we found that only 33% of patients received NOACs.

The 2014 ESC/European Association for Cardio-Thoracic Surgery (EACTS) guidelines on myocardial revascularization[4] recommend that patients with a definite indication for OAC therapy (e.g. AF patients with a CHA_2DS_2-VASc score of 2 or more) should receive OAC without antiplatelet treatment 1 year after the revascularization. Antiplatelet treatment was administered in 15.3% of patients, and a combination of OAC and antiplatelet treatments

was found in 7.7% of the cases in this survey, although it is unclear if revascularization was performed within the recent year.

However, when, in a separate question, patients were asked if they were treated with an OAC, 82% patients reported taking the medication, which was a higher percentage compared with the calculated rate obtained from another question containing the list of specific blood-thinning agents. This difference may be explained by the fact that some patients are not well informed about the trade name of the blood-thinning agents. Note that ~90% of the patients with a CHA_2DS_2-VASc score of 2 or more were receiving an OAC.

Since the elimination of some NOACs significantly depends on the renal pathway, monitoring of renal function is mandatory, especially if renal function is compromised. Practical considerations about NOAC use have recently been addressed in the EHRA Practical Guide for NOAC use,[5] which recommends mandatory regular monitoring of renal function annually in patients with normal or mild renal impairment, and more frequently in patients with moderate renal impairment. Since only 157 (53.9%) of NOAC users were aware of this requirement, this survey shows that the awareness of renal function monitoring needs to be stronger emphasized.

This survey shows that OAC therapy was discontinued in ~14.5%, which is consistent with the earlier report,[6] but the reason for discontinuation remains unclear in the majority of the cases. Although a history of bleeding was reported by 13% of patients taking OACs, bleeding was the reason for stopping the OAC in only 4% of cases. It is encouraging that in the real world setting, minor or nuisance bleeds were not the reason to withdraw OAC, at least not in this survey. Moreover, the higher incidence of bleedings among patients on combination therapies and the lower incidence on NOACs seem to further confirm the results published in previous trials.

A recent study has shown that it is possible to increase the patient's knowledge about AF and anticoagulation therapy.[7] Educational interventions significantly influence the patient's knowledge and perception of AF.[8] Other surveys emphasized the need for structured educational programmes to improve the use of OACs.[9] Recently, an EHRA consensus document focusing on patient values and preferences in relation to cardiac arrhythmias, including AF, has been published in collaboration with Heart Rhythm Society, Asia Pacific Heart Rhythm Society, and Sociedad Latinoamericana de Estimulación Cardíaca y Electrofisiología.[10]

Conclusion

This survey shows that there is still room for improvement of patient education and compliance in patients treated with anticoagulants. Education of AF patients thus should be reinforced to reduce complications rates and improve compliance. This holds true in particular for patients taking NOACs.

References

1. Kannel WB, Wolf PA, Benjamin EJ, Levy D. Prevalence, incidence, prognosis, and predisposing conditions for atrial fibrillation: population-based estimates. *Am J Cardiol* 1998;**82**:2N–9N.
2. Wolf PA, Abbott RD, Kannel WB. Atrial fibrillation: a major contributor to stroke in the elderly. The Framingham study. *Arch Intern Med* 1987;**147**:1561–4.
3. Camm AJ, Lip GY, De Caterina R, Savelieva I, Atar D, Hohnloser SH et al. 2012 focused update of the ESC guidelines for the management of atrial fibrillation: an update of the 2010 ESC guidelines for the management of atrial fibrillation. *Europace* 2012;**14**:1385–413.
4. Heidbuchel H, Verhamme P, Alings M, Antz M, Hacke W, Oldgren J et al. European Heart Rhythm Association Practical Guide on the use of new oral anticoagulants in patients with non-valvular atrial fibrillation. *Europace* 2013;**15**:625–51.
5. Windecker S, Kolh P, Alfonso F, Collet JP, Cremer J, Falk V et al. 2014 ESC/EACTS guidelines on myocardial revascularization. *Eur Heart J* 2014;**35**:2541–619.
6. O'Brien EC, Simon DN, Allen LA, Singer DE, Fonarow GC, Kowey PR et al. Reasons for warfarin discontinuation in the outcomes registry for better informed treatment of atrial fibrillation (ORBIT-AF). *Am Heart J* 2014;**168**:487–94.
7. Lahaye S, Regpala S, Lacombe S, Sharma M, Gibbens S, Ball D et al. Evaluation of patients' attitudes towards stroke prevention and bleeding risk in atrial fibrillation. *Thromb Haemost* 2014;**111**:465–73.
8. Lane DA, Barker RV, Lip GY. Best practice for atrial fibrillation patient education. *Curr Pharm Des* 2014;**21**:533–43.
9. Potpara TS, Pison L, Larsen TB, Estner H, Madrid A, Blomström-Lundqvist C. How are patients with atrial fibrillation approached and informed about their risk profile and available therapies in Europe? Results of the European Heart Rhythm Association Survey. *Europace* 2015;**17**:468–72.
10. Lane DA, Aguinaga L, Blomström-Lundqvist C, Boriani G, Dan GA, Hills MT et al. Cardiac tachyarrhythmias and patient values and preferences for their management: the European Heart Rhythm Association (EHRA) consensus document endorsed by the Heart Rhythm Society (HRS), Asia Pacific Heart Rhythm Society (APHRS), and Sociedad Latinoamericana de Estimulación Cardíaca y Electrofisiología (SOLEACE). *Europace* 2015;**17**:1747–69.