

Original Research

Differences in Management of Atrial Fibrillation Between Cardiologists and Non-Cardiologists in Greece

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Introduction: We aimed to assess trends in the management of atrial fibrillation (AF) at various levels of medical care in Greece and to compare the treatment practices of cardiologists to those of non-cardiologists.

Methods: From January to May 2007, 500 questionnaires were mailed to cardiologists, internists and general practitioners, randomly selected from regional medical associations. Questions assessed management practices for paroxysmal, persistent and permanent AF.

Results: A total of 309 physicians (194 cardiologists and 115 non-cardiologists) responded. Cardiologists showed no preference regarding the site of cardioversion of paroxysmal AF, whereas non-cardiologists tend to cardiovert paroxysmal AF in the emergency department. Intravenous amiodarone is the most frequently used antiarrhythmic agent for cardioversion by both groups (63% vs. 71%, $p=NS$). Cardiologists utilise propafenone or ibutilide more frequently than non-cardiologists (24% vs. 11%, $p<0.05$ and 10% vs. 2%, $p<0.01$ respectively), while 12% of non-cardiologists would use digitalis for cardioversion (vs. 0.5% of cardiologists, $p<0.001$). Cardiologists prescribe commonly, but less frequently than non-cardiologists (42% vs. 59%, $p<0.01$) an antiarrhythmic drug after the first episode of paroxysmal AF, propafenone being the most popular among cardiologists (66%) and amiodarone (33%) or digitalis (23%) among general practitioners/internists. Beta-blockers are considered as first choice agents for rate control among cardiologists, while non-cardiologists would prescribe mainly digitalis. Antiplatelet agents were suggested by most physicians after cardioversion of the first episode of AF in low-risk patients. Cardiologists prefer aspirin, while non-cardiologists would prescribe clopidogrel as first choice antiplatelet agent. Both groups would recommend anticoagulants in high risk patients; nevertheless, in elderly patients without other risk factors, anticoagulants are more often prescribed by cardiologists (79% vs. 50%, $p<0.001$).

Conclusions: Important differences exist in the management of AF between cardiologists and general practitioners/internists in Greece. Non-cardiologists overuse digitalis, underuse beta-blockers, prefer clopidogrel to aspirin and are reluctant to prescribe anticoagulants in the elderly.

Atrial fibrillation (AF) is the most common atrial arrhythmia. Its management involves a great challenge because of its significant prevalence in both young and older patients^{1,2} and the associated increased risk of hospitalisation, heart failure and stroke.^{3,4} The main therapeutic goals in AF management are rhythm or

rate control and the prevention of thromboembolism. Numerous studies and guidelines⁵⁻⁷ have addressed the problem of optimising the treatment strategy for AF, in an attempt to indicate safe and effective drugs for the cardioversion of paroxysmal AF and for sinus rhythm maintenance, to describe patient groups that are expected

to benefit from rhythm rather than rate control,⁸⁻¹⁰ as well as to determine the optimal stroke prevention strategy according to age and coexistent risk factors.

AF is treated by cardiologists, by internists and general practitioners at various levels of medical care. There is evidence that clinicians do not strictly adhere to AF management guidelines and there are differences between the treatment strategies followed by cardiologists and non-cardiologists.^{7,11,12}

The aim of the present study was to assess patterns of AF management at various levels of medical care in Greece, focusing on the differences between cardiologists and non-cardiologists.

Methods

Study protocol

A 20-point questionnaire was designed by the principal investigator of this study (V.V.) concerning medical training, setting of medical practice and practice patterns regarding the management of paroxysmal, persistent and permanent AF. Questionnaires, after being piloted on local colleagues, were mailed, or were handed whenever possible, to 500 randomly chosen physicians – 250 cardiologists, 125 internists and 125 general practitioners – all of whom were enrolled in regional medical associations. The questionnaires were distributed from January to May 2007 and responses were collected by August 2007. All questionnaires were accompanied by a letter describing the purpose of the survey, emphasising the importance of providing answers according to everyday practice patterns and not according to what is believed to be the optimal treatment. The first part of the questionnaire addressed the specialty, the geographic location and the level of medical practice of the participating physician. The second part concerned the management of paroxysmal AF, namely site of cardioversion, duration of hospital stay, preferred agent for cardioversion, and preferred agent for rhythm control. The third part of the questionnaire referred to the management of persistent AF and included questions on the preferred mode of cardioversion (electrical or pharmacological) and the preferred drug for pharmacological cardioversion. This part also included questions regarding the tests ordered as part of the investigation concerning the cause of paroxysmal AF and the use of echocardiography before cardioversion of persistent AF. In the fourth part there were questions concerning the management of patients with permanent AF, namely the preferred agents for rate

control according to clinical co-morbidities. Finally, the last part consisted of questions about antiplatelet and anticoagulant prescription according to age group and thromboembolism risk factors (prior stroke, transient ischaemic attack or systemic embolism, hypertension, heart failure, impaired systolic function of the left ventricle, or diabetes mellitus).

Definitions

Definitions used in the questionnaire were given in a short text following the questions and are reported here.

Paroxysmal AF

Recurrent AF that terminates spontaneously and lasts less than seven days (mostly <24 h).

Persistent AF

Recurrent AF or sustained AF lasting more than seven days. Termination of AF by pharmacological therapy or electrical cardioversion does not necessarily differentiate between paroxysmal and persistent AF, as pharmacological and electrical cardioversion are used in both conditions.

Permanent AF

AF has been present for a long time, cardioversion has not been indicated, or one or several attempts have failed to restore reliable sinus rhythm.

Structural heart disease

Coronary heart disease, heart failure, valvular heart disease, cardiomyopathy.

Statistical analysis

Statistical analysis was performed using SPSS version 15.0 for windows. All variables were categorical and were expressed as absolute numbers and percentages. For comparisons between variables we used the chi-square test. A $p < 0.05$ was considered statistically significant.

Results are presented in tables as observed values and percentages. Addition of absolute values does not always equal the number of participating physicians, owing to incomplete answers, or multiple answering options. The number of completed answers for each questionnaire item is presented in

detail in the results tables. Percentages, however, are adjusted for the missing values and in all cases add up to 100%, except for the items with multiple answering options.

Results

We received 309 completed questionnaires (response rate 61.8%), 194 of which came from cardiologists

and 115 from internists or general practitioners. The geographical distribution of the responding physicians was Macedonia 30%, Thrace 1%, Epirus 4%, Thessaly 20%, Mainland 11%, Peloponnese 13% and Crete 17%. Characteristics of the medical practice of participating physicians are presented in Table 1.

We observed differences in the management of paroxysmal AF between cardiologists and non-cardiologists (Table 2).

Table 1. Level of medical practice of the participating physicians.

Level of medical practice	All n=309	Cardiologists n=194	Non-cardiologists n=115
Private practice	26/285 (9)	24/174 (14)	2/111 (2) [†]
Health centre	9/285 (3)	1/174 (1)	8/111 (7)*
Peripheral hospital	22/285 (8)	21/174 (12)	1/111 (1) [†]
Prefectural hospital	149/285 (52)	79/174 (45)	70/111 (63)*
University hospital	79/285 (28)	49/174 (28)	30/111 (27)

Data are presented as observed number/total completed answers (%).

Significant differences between cardiologists and non-cardiologists are flagged: *p<0.005; †p<0.001.

Table 2. Management of paroxysmal atrial fibrillation (PAF) by cardiologists and non-cardiologists in Greece.

	All n=309	Cardiologists n=194	Non-cardiologists n=115
Site of PAF cardioversion:			
Emergency department	118/304 (39)	55/190 (29)	63/114 (55) [§]
Short-stay unit	61/304 (20)	36/190 (19)	25/114 (22)
Coronary care unit	62/304 (20)	53/190 (28)	9/114 (8) [§]
Cardiology ward	63/304 (21)	46/190 (24)	17/114 (15)
First choice agent for PAF cardioversion:			
Amiodarone	199/301 (66)	119/189 (63)	80/112 (71)
Propafenone	58/301 (19)	45/189 (24)	13/112 (11)*
Quinidine	7/301 (2)	4/189 (2)	3/112 (3)
Procainamide	2/301 (1)	1/189 (0.5)	1/112 (1)
Ibutilide	21/301 (7)	19/189 (10)	2/112 (2) [†]
Digitalis	14/301 (5)	1/189 (0.5)	13/112 (12) [§]
Duration of hospital stay after successful cardioversion:			
1-3 h	53/303 (17)	34/192 (18)	19/112 (17)
3-6 h	70/303 (23)	50/192 (26)	20/112 (18)
24 h	149/303 (49)	93/192 (48)	56/112 (50)
>24 h	31/303 (11)	15/192 (8)	17/112 (15)
Prescription of an antiarrhythmic agent after the first episode:			
Yes/probably yes	147/306 (48)	80/190 (42)	67/113 (59) [†]
No/probably no	159/306 (52)	110/190 (58)	46/113 (41)
Drug of choice for sinus rhythm maintenance in patients without structural heart disease:			
Propafenone	159/302 (52)	127/193 (66)	32/109 (29) [§]
Sotalol	44/302 (15)	28/193 (15)	16/109 (15)
Quinidine	0/302	0/193	0/109
Amiodarone	66/302 (22)	30/193 (16)	36/109 (33) [‡]
Digitalis	33/302 (11)	8/193 (4)	25/109 (23) [§]

Data are presented as observed number/total completed answers (%). Significant values are flagged: *p<0.05; †p<0.01, ‡p<0.005, §p<0.001.

The majority of physicians of both groups prefer to keep the patient overnight after successful cardioversion. Amiodarone is highly preferable for the cardioversion of paroxysmal AF in both groups. Non-cardiologists are less likely to administer propafenone or ibutilide. Instead, 12% of non-cardiologists favour digitalis as first choice drug for paroxysmal AF cardioversion. Non-cardiologists are more likely to prescribe an antiarrhythmic agent after successful cardioversion of the first paroxysmal AF episode and they seem to choose almost equally between amiodarone and propafenone. Surprisingly, nearly one out of four non-cardiologists is likely to choose digitalis for sinus rhythm maintenance after successful cardioversion of paroxysmal AF.

As part of the investigation for paroxysmal AF, more than one half of cardiologists would order an exercise test or a 24-hour Holter recording. In contrast, one fourth of non-cardiologists would also suggest an electrophysiological study (Figure 1).

Management decisions by cardiologists and non-cardiologists in relation to persistent AF are presented in Table 3. The majority of the clinicians prefer pharmacological cardioversion, although cardiologists use electrical cardioversion more frequently compared to internists. Amiodarone is rated first in the preferences of both groups as the first choice drug for pharmacological cardioversion of persistent AF. However, 22% of cardiologists would administer ibutilide, while 11%

of non-cardiologists would prefer digitalis. Before cardioversion the majority of the physicians would order an echocardiogram (Figure 2). The transoesophageal echocardiogram is mostly preferred by cardiologists.

Variations in the management of permanent AF are presented in Table 4. Beta-blockers are chosen by the majority of cardiologists for rate control in patients with or without structural heart disease (55% and 76%, respectively), while non-cardiologists are reluctant to use them in both situations. Non-cardiologists more often use diltiazem or digitalis for rate control, the latter preferred mostly in patients with structural heart disease.

Almost 70% of both cardiologists and non-cardiologists administer antiplatelet drugs to patients without risk factors who are between 50 and 75 years of age, and almost 80% of both groups administer antiplatelet agents to patients over 75 years of age, after cardioversion of their first paroxysmal AF episode (Table 5). Interestingly, clopidogrel comes second in non-cardiologists' preferences as antiplatelet treatment after cardioversion of the first episode of paroxysmal AF in patients without risk factors. Finally, anticoagulation treatment in patients over 75 years of age after the first episode of paroxysmal AF is prescribed by nearly 80% of cardiologists, but by only one half of non-cardiologists (Table 6). Both groups, however, seem to consider equally the ability of each individual patient to comply with anticoagulation

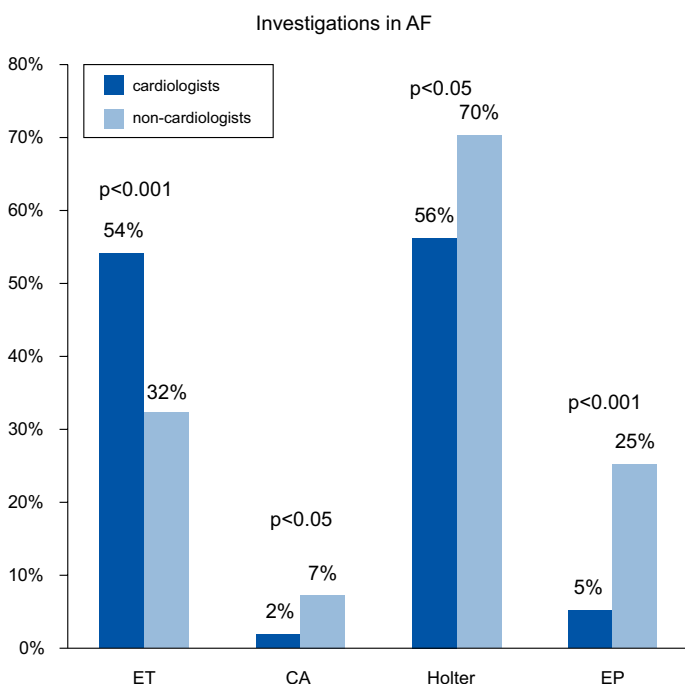


Figure 1. Percentages of cardiologists and non-cardiologists who would suggest an exercise test (ET), coronary angiography (CA), an ECG Holter recording or an electrophysiological study (EP), as part of the investigation of paroxysmal atrial fibrillation (AF).

Table 3. Management of persistent atrial fibrillation (AF) by cardiologists and non-cardiologists in Greece.

	All n = 309	Cardiologists n = 194	Non-cardiologists n = 115
First choice method for cardioversion in patients with persistent AF under coagulation therapy:			
Pharmacological	257/303 (85)	154/192 (80)	103/111 (93)
Electrical	46/303 (15)	38/192 (20)	8/111 (7)*
Drug of choice for cardioversion of persistent AF:			
Amiodarone	203/291 (70)	122/183 (67)	81/108 (75)
Ibutilide	48/291 (17)	41/183 (22)	7/108 (6.5)†
Propafenone	22/291 (7)	15/183 (8)	7/108 (6.5)
Sotalol	2/291 (0.5)	1/183 (0.5)	1/108 (1)
Digitalis	15/291 (5)	3/183 (2)	12/108 (11)*
Quinidine	1/291 (0.5)	1/183 (0.5)	0/108 (0)
Electrical cardioversion in case of drug failure:			
Yes	223/302 (74)	158/192 (82)	65/110 (59)†

Data are presented as observed number/total completed answers (%). Significant values are flagged: * $p < 0.005$; † $p < 0.001$.

treatment before deciding to prescribe it. Anticoagulation therapy in patients with permanent AF and hypertension or diabetes is usually suggested by both groups; nevertheless, non-cardiologists are less likely than cardiologists to administer a vitamin K antagonist in patients over 75 years old.

Discussion

The current study presents the results of a survey that reflects the routine clinical practice in a wide spectrum

of medical centres in Greece. Physicians do not strictly adhere to guidelines concerning AF management. In addition, significant differences in practice patterns are observed between cardiologists and non-cardiologists. To our knowledge, this is the first study concerning AF management practices in Greece.

Rhythm control

Pharmacological cardioversion of paroxysmal AF is usually the standard initial approach and it can be at-

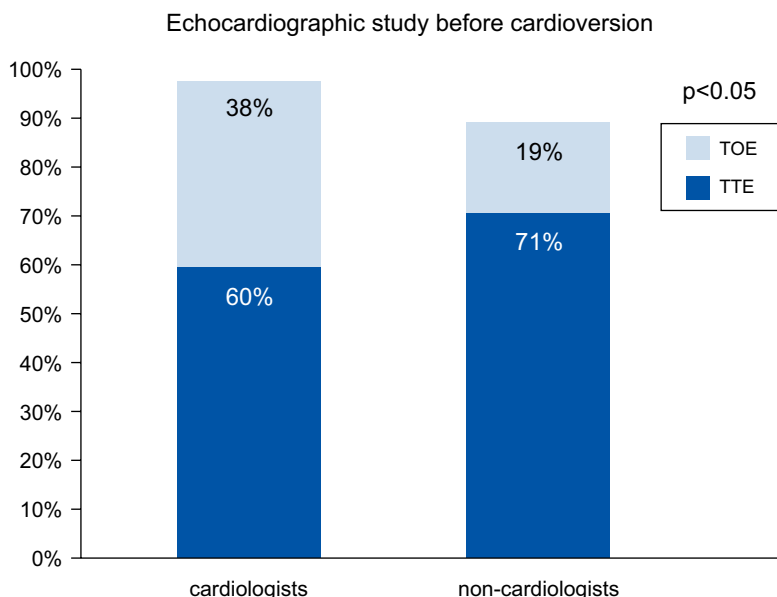


Figure 2. Percentage of cardiologists and non-cardiologists who would order a transthoracic echocardiogram (TTE) or a transoesophageal echocardiogram (TOE) before cardioversion of persistent atrial fibrillation.

Table 4. Management of permanent atrial fibrillation (AF) by cardiologists and non-cardiologists in Greece.

	All n=309	Cardiologists n=194	Non-cardiologists n=115
Drug of choice for rate control in patients with structural heart disease:			
Beta-blockers	121/281 (43)	97/177 (55)	24/104 (23) [§]
Verapamil	9/281 (3)	5/177 (3)	4/104 (4)
Diltiazem	24/281 (8)	7/177 (4)	17/104 (16) [‡]
Digitalis	100/281 (36)	52/177 (29)	48/104 (46) [†]
Amiodarone	27/281 (10)	16/177 (9)	11/104 (11)
Drug of choice for rate control in patients without structural heart disease:			
Beta-blockers	193/300 (64)	141/186 (76)	52/114 (46) [§]
Verapamil	7/300 (2)	3/186 (2)	4/114 (3)
Diltiazem	45/300 (16)	17/186 (9)	28/114 (25) [‡]
Digitalis	48/300 (16)	23/186 (12)	25/114 (22) [*]
Amiodarone	7/300 (2)	2/186 (1)	5/114 (4)

Data are presented as observed number/total completed answers (%). Significant values are flagged: * $p < 0.05$; † $p < 0.01$; ‡ $p < 0.005$; § $p < 0.001$.

Table 5. Antiplatelet prescription after cardioversion of paroxysmal atrial fibrillation (PAF).

	All n=309	Cardiologists n=194	Non-cardiologists n=115
Antiplatelet prescription after successful cardioversion in patients without risk factors according to age group: ¹			
25-50 y	57/302 (19)	32/188 (17)	25/114 (22)
50-75 y	215/304 (71)	133/190 (70)	82/114 (72)
>75 y	239/305 (78)	151/191 (79)	88/114 (77)
Antiplatelet drug of choice after PAF:			
Aspirin 100 mg	161/274 (59)	108/173 (62)	53/101 (52)
Aspirin 325 mg	67/274 (24.5)	52/173 (30)	15/101 (15) [*]
Clopidogrel 75 mg	45/274 (16)	12/173 (7)	33/101 (33) [†]
Triflusal	1/274 (0.5)	1/173 (1)	0/101 (0)

¹Patients not eligible or with contraindication for anticoagulants.

Data are presented as observed number/total completed answers (%). Significant values are flagged: * $p < 0.01$; † $p < 0.001$.

tempted in either the emergency department, the short-stay unit, a cardiology ward or the coronary care unit. Most patients stay overnight in hospital after successful cardioversion.

Various drugs have been used for this purpose, with comparable results concerning efficacy and safety. Amiodarone, according to the 2006 ACC/AHA/ESC practice guidelines, has a class IIa recommendation for pharmacological cardioversion of AF of less than or equal to seven days' duration, while propafenone and ibutilide have a class I recommendation.⁵ However, ibutilide is a newer, expensive drug that is administered intravenously and requires monitoring, a fact that limits its administration to in-hospital use. Amiodarone is more often chosen for paroxysmal AF cardioversion by both cardiologists and non-

cardiologists, even though propafenone seems more practical to use. A possible explanation for this is that propafenone is contraindicated in patients with ischaemic heart disease.⁵ Quinidine and procainamide are not widely studied agents, but the available results show them to have lower efficacy.⁵ Interestingly, digitalis is used for paroxysmal or persistent AF cardioversion as well as for sinus rhythm maintenance after successful cardioversion by non-cardiologists, despite having only a class III recommendation for this purpose,⁵ suggesting that internists are not well informed or are reluctant to follow the practice guidelines. As expected, cardiologists are better informed of the current guidelines; even so, a few of them would still administer digitalis for cardioversion or sinus rhythm maintenance.

Table 6. Anticoagulation therapy in patients with atrial fibrillation (AF)

	All n=309	Cardiologists n=194	Non-cardiologists n=115
Anticoagulation therapy in patients with hypertension or diabetes and permanent AF according to age:			
25-50 y	196/306 (64)	117/194 (60)	79/112 (70)
50-75 y	285/306 (93)	178/193 (92)	107/113 (95)
>75 y	276/305 (90)	181/192 (94)	95/113 (84)*
Anticoagulation after first episode of PAF in patients aged >75 years without structural heart disease:			
Always/usually	208/301 (69)	152/192 (79)	56/109 (51)†
Seldom/never	93/301 (31)	40/192 (21)	54/109 (49)
Do you consider patient's ability to comply before prescribing a vitamin K antagonist?			
Yes	302/308 (98)	109/114 (96)	193/194 (99.5)
No	6/308 (2)	5/114 (5)	1/194 (0.5)

PAF – paroxysmal AF. Data are presented as observed number/total completed answers (%). Significant values are flagged: *p<0.01; †p<0.001.

Rate control

Ventricular rate control has been proved by large trials to be equally effective to sinus rhythm restoration in terms of survival, quality of life and other clinical outcomes.¹³⁻¹⁵ The present survey, however, did not address directly the dilemma of rhythm versus rate control in specific case scenarios, but aimed to assess the treatment choices once a specific therapeutic decision is already made. Drug prescription for rate control in patients with permanent AF aims to preserve haemodynamic stability by preventing acceleration of the ventricular rate at rest, as well as during exercise, and to control symptoms and improve quality of life.¹⁶ Cardiologists are cautious in prescribing diltiazem because of the negative inotropic effects of the non-hydropyridine calcium channel antagonist agents, while they are convinced about the pleiotropic beneficial effects of beta-blockers in cardiovascular disease. Non-cardiologists, on the other hand, are sceptical about the possible side effects of beta-blocking agents and they may tend to avoid beta-blockers in patients with heart failure or mild obstructive pulmonary disease.

Investigations for AF

Greek physicians would correctly ask for ambulatory ECG (Holter) monitoring, as it provides valuable information on ventricular rate response and is useful in adjusting drug dosage for rate control. However, non-cardiologists tend to suggest invasive tests, such

as an electrophysiological study or coronary angiography, more often than cardiologists, while on the other hand, only a small proportion would ask for an exercise test. This is suggestive of relevant ignorance of the potential diagnostic ability and possible complications of these invasive tests on the part of non-cardiologists. Cardiologists know better that exercise testing should be performed in case of suspected myocardial ischaemia and prior to initiating type IC antiarrhythmic drugs. In addition, it is helpful to assess the adequacy of rate control during exercise. Cardiologists seem to apply more stringent criteria for the selection of patients who need to undergo an electrophysiological study, which is perhaps reserved for patients with AF who are considered as candidates for ablation. In the latter case an electrophysiological study is indeed helpful.¹⁷

Transoesophageal echocardiography before cardioversion has been shown to be a sensitive and specific technique for the detection of thrombi in the left atrium or the left atrial appendage.¹⁸ Cardiologists are more accustomed and have better access to transoesophageal echocardiography; therefore, they use it more frequently.

Stroke prevention

Stroke prevention in patients with AF is a major treatment goal. According to the ACC/AHA/ESC 2006 guidelines,⁵ vitamin K antagonists should be administered in every patient with AF and any high-risk factor (prior stroke, transient ischaemic attack or thromboembo-

lism, mitral stenosis, prosthetic heart valve), or more than one moderate risk factor for stroke (age 75 years or greater, hypertension, heart failure, impaired left ventricular systolic function, diabetes mellitus). Aspirin, 81-325 mg daily, is recommended as an alternative to vitamin K antagonists in low-risk patients or in those with contraindications for oral anticoagulation. Clopidogrel alone, although is not recommended for prevention of thromboembolism, is preferred by a large proportion of non-cardiologists. The addition of clopidogrel 75 mg daily to aspirin in patients who are ineligible to receive vitamin K antagonists has been shown lately to reduce major vascular events, while increasing the risk of major haemorrhage.¹⁹ However, the option of combination antiplatelet therapy was not included as a possible answer in the provided questionnaire. Triflusal, a promising alternative to aspirin that has proved to be equally effective but safer in geriatric patients with atherothrombotic cardiac and cardiovascular disease,²⁰ was almost ignored as a possible treatment option by both cardiologists and non-cardiologists. This fact, though, is not surprising, as triflusal has not been compared to aspirin for efficacy and safety regarding AF.

This survey showed that cardiologists in Greece are likely to administer antithrombotic treatment to patients according to indications, while on the other hand, non-cardiologists are sceptical about prescribing anticoagulants for older patients. Previous surveys concerning differences in AF management between cardiologists and non-cardiologists in the UK²¹ and in the Netherlands²² also showed that cardiologists are more likely to consider antithrombotic treatment in AF patients compared with non-cardiologists. A trend to overtreat low risk patients was shown in German medical centres¹² and in ESC member countries;⁷ the latter survey was conducted in university and specialised centres, where almost half of the patients with AF who received oral anticoagulation were not eligible for it. The vast majority of the participating clinicians in our survey provided answers that promise adequate antithrombotic treatment of AF patients aged 75 years and more. This is in accordance with a survey of practice cardiologists in Geneva, which reported that guidelines concerning antithrombotic treatment for AF patients can be successfully applied in the real world.²³ Antithrombotic guideline implementation is of major importance in AF management, since antithrombotic undertreatment of high risk patients was associated with a worse cardiovascular prognosis during one year, while overtreatment did not result in a higher risk for major bleeding.²⁴ Moreover, the risk of stroke that can be pre-

vented was estimated to be 4.9% per year, especially in older patients in whom anticoagulation is often withheld for fear of intracranial bleeding, which occurs ten times less frequently than ischaemic stroke.²⁵ A questionnaire-based survey among Australian physicians revealed that experience of patients suffering adverse events while on vitamin K antagonists acted as a psychological barrier to the prescription of oral anticoagulation.²⁶

Limitations

This is a questionnaire survey of Greek physicians and, even though the investigators took particular care to explain the purpose of the study in order to receive realistic answers, actual clinical practices may differ from the ones reported. Nevertheless, this is the first study to reveal trends in atrial fibrillation management by cardiologists and non-cardiologists over a wide spectrum of medical care in Greece. Our results await confirmation by a multi-centre observational study regarding AF management (RAFTING study), which is currently ongoing.

Conclusions

Non-cardiologists seem to be inadequately informed about the current guidelines in AF management practices. They favour the use of digitalis for cardioversion and sinus rhythm maintenance, tend to avoid beta-blockers for rate control, and regard clopidogrel as a better antiplatelet choice than aspirin in patients with AF. Non-cardiologists believe that invasive tests are needed as part of the investigation of AF and underestimate the value of exercise testing. Finally, with regard to stroke prevention, non-cardiologists and, to a smaller extent, cardiologists tend to undertreat older patients, while on the other hand, younger patients without risk factors for thromboembolic events are usually overtreated.

References

1. Feinberg WM, Blackshear JL, Laupacis A, Kronmal R, Hart RG. Prevalence, age distribution, and gender of patients with atrial fibrillation. Analysis and implications. *Arch Intern Med.* 1995; 155: 469-473.
2. Go AS, Hylek EM, Phillips KA, et al. Prevalence of diagnosed atrial fibrillation in adults: national implications for rhythm management and stroke prevention: the AnTicoagulation and Risk Factors in Atrial Fibrillation (ATRIA) Study. *JAMA.* 2001; 285: 2370-2375.
3. Kannel WB, Abbott RD, Savage DD, McNamara PM. Coronary heart disease and atrial fibrillation: the Framingham Study. *Am Heart J.* 1983; 106: 389-396.

4. Krahn AD, Manfreda J, Tate RB, Mathewson FA, Cuddy TE. The natural history of atrial fibrillation: incidence, risk factors, and prognosis in the Manitoba Follow-Up Study. *Am J Med.* 1995; 98: 476-484.
5. Fuster V, Rydén LE, Cannom DS et al. ACC/AHA/ESC 2006 guidelines for the management of patients with atrial fibrillation: full text: a report of the American College of Cardiology/American Heart Association Task Force on practice guidelines and the European Society of Cardiology Committee for Practice Guidelines (Writing Committee to Revise the 2001 guidelines for the management of patients with atrial fibrillation) developed in collaboration with the European Heart Rhythm Association and the Heart Rhythm Society. *Europace.* 2006; 8: 651-745.
6. Naccarelli GV, Wolbrette DL, Khan M, et al. Old and new antiarrhythmic drugs for converting and maintaining sinus rhythm in atrial fibrillation: comparative efficacy and results of trials. *Am J Cardiol.* 2003; 91: 15D-26D.
7. Nieuwlaet R, Capucci A, Camm AJ, et al; European Heart Survey Investigators. Atrial fibrillation management: a prospective survey in ESC Member Countries: the Euro Heart Survey on Atrial Fibrillation. *Eur Heart J.* 2005; 26: 2422-2434
8. Grönefeld G, Hohnloser SH. Towards a consensus in rate versus rhythm control for management of atrial fibrillation: insights from the PIAF trial. *Card Electrophysiol Rev.* 2003; 7: 113-117.
9. Hohnloser SH, Kuck KH, Lilienthal J. Rhythm or rate control in atrial fibrillation—Pharmacological Intervention in Atrial Fibrillation (PIAF): a randomised trial. *Lancet.* 2000; 356: 1789-1794.
10. Opolski G, Torbicki A, Kosior DA, et al. Rate control vs rhythm control in patients with nonvalvular persistent atrial fibrillation: the results of the Polish How to Treat Chronic Atrial Fibrillation (HOT CAFE) Study. *Chest.* 2004; 126: 476-486.
11. Gattellari M, Worthington JM, Zwar NA, Middleton S. The management of non-valvular atrial fibrillation (NVAf) in Australian general practice: bridging the evidence-practice gap. A national, representative postal survey. *BMC Fam Pract.* 2008; 9: 62.
12. Nabauer M, Gerth A, Limbourg T et al. The Registry of the German Competence NETwork on Atrial Fibrillation: patient characteristics and initial management. *Europace.* 2009; 11: 423-434.
13. Corley SD, Epstein AE, DiMarco JP, et al. Relationships between sinus rhythm, treatment, and survival in the Atrial Fibrillation Follow-up Investigation of Rhythm Management (AFFIRM) Study. *Circulation.* 2004; 109: 1509-1513.
14. Falk RH. Is rate control or rhythm control preferable in patients with atrial fibrillation? Rate control is preferable to rhythm control in the majority of patients with atrial fibrillation. *Circulation.* 2005; 111: 3141-3150.
15. Hagens VE, Ranchor AV, Van Sonderen E, et al. Effect of rate or rhythm control on quality of life in persistent atrial fibrillation. Results from the Rate Control Versus Electrical Cardioversion (RACE) Study. *J Am Coll Cardiol.* 2004; 43: 241-247.
16. Rienstra M, Van Gelder IC. Who, when and how to rate control for atrial fibrillation. *Curr Opin Cardiol.* 2008; 23: 23-27.
17. Efremidis M, Sideris A, Xydonas S, et al. Ablation of atrial fibrillation in patients with heart failure: reversal of atrial and ventricular remodelling. *Hellenic J Cardiol.* 2008; 49: 19-25.
18. Pearson AC, Labovitz AJ, Tatineni S, Gomez CR. Superiority of transesophageal echocardiography in detecting cardiac source of embolism in patients with cerebral ischemia of uncertain etiology. *J Am Coll Cardiol.* 1991; 17: 66-72.
19. Connolly SJ, Pogue J, Hart RG, et al. Effect of clopidogrel added to aspirin in patients with atrial fibrillation. *N Engl J Med.* 2009; 360: 2066-2078.
20. Anninos H, Andrikopoulos G, Pastromas S, Sakellariou D, Theodorakis G, Vardas P. Triflusal: an old drug in modern antiplatelet therapy. Review of its action, use, safety and effectiveness. *Hellenic J Cardiol.* 2009; 50: 199-207.
21. Lip GY, Zarifis J, Watson RD, Beevers DG. Physician variation in the management of patients with atrial fibrillation. *Heart.* 1996; 75: 200-205.
22. Dinh T, Nieuwlaet R, Tieleman RG, et al. Antithrombotic drug prescription in atrial fibrillation and its rationale among general practitioners, internists and cardiologists in The Netherlands –The EXAMINE-AF study. A questionnaire survey. *Int J Clin Pract.* 2007; 61: 24-31.
23. Meiltz A, Zimmermann M, Urban P, Bloch A. Atrial fibrillation management by practice cardiologists: a prospective survey on the adherence to guidelines in the real world. *Europace.* 2008; 10: 674-680.
24. Nieuwlaet R, Olsson SB, Lip GYH, et al. Guideline-adherent antithrombotic treatment is associated with improved outcomes compared with undertreatment in high-risk patients with atrial fibrillation. The Euro Heart Survey on Atrial Fibrillation. *Am Heart J.* 2007; 153: 1006-1012.
25. Zehnder BS, Schaer BA, Jeker U, Cron TA, Osswald S. Atrial fibrillation: estimated excess rate of stroke due to lacking adherence to guidelines. *Swiss Med Wkly.* 2006; 136: 757-760.
26. Gattellari M, Worthington J, Zwar N, Middleton S. Barriers to the use of anticoagulation for nonvalvular atrial fibrillation: a representative survey of Australian family physicians. *Stroke.* 2008; 39: 227-230.