A survey of atrial fibrillation in general practice: the West Birmingham Atrial Fibrillation Project

GREGORY Y H LIP

DANIEL J GOLDING

MASOOD NAZIR

D GARETH BEEVERS

DAVID L CHILD

R IAN FLETCHER

SUMMARY

Background. *The management of atrial fibrillation (AF) has changed substantially in recent years, especially with a greater appreciation of the prophylactic role of antithrombotic therapy against stroke. There is therefore a need for further information on the prevalence of AF in Britain, the prevalence of (and contraindications to) anticoagulant treatment, and the factors that influence doctors' decisions in treating AF, including the investigation of patients with this arrhythmia.*

Aim. *To investigate the prevalence, clinical features and management of patients with AF in a general practice setting.*

Method. *Cross-sectional survey of patients using treatment prescriptions and clinical records in two general practices from the west of Birmingham (serving a patient population of 16 519) where 4522 subjects (27.4%) were aged ⩾50 years.*

Results. *One hundred and eleven (2.4%) patients who were aged ⩾50 years were found to be in AF (42 males; mean age 76.6, SD 9.1); 77.5% were Caucasian, 2.7% Afro-Caribbean, 0.9% Asian, and 0.9% mixed race; in 20 cases there was no information on ethnicity. Of the AF patients, 5.4% were aged 50–60 years, 16.2% aged 61–70 years, 20.7% aged 71–75 years, 20.7% aged 76–80 years, 24.3% aged 81–85 years, and 12.6% aged >85 years old, with female patients being significantly older than males. Eighty-one patients (73%) had chronic AF, while 30 patients (27%) had paroxysmal AF. The most common associated factors were hypertension (36.9%) and ischaemic heart disease (28.8%), with no obvious cause for AF in six patients. Cardiac failure was associated with AF in 34 patients (30.6%), and stroke had occurred in 29 patients (18%). Only 20 patients (18%) had had an echocardiogram, 26 (23.4%) a chest X-ray, and 58 (52.3%) thyroid function test. Only 30.6% had ever presented to hospital practice. Warfarin was prescribed to 40 patients (36%), with anticoagulation intensity monitoring by the general practitioner (GP) in three cases (7.5%), by a hospital clinic in 30 (75%), and by both GP and hospital in seven cases (17.5%). Of those not anticoagulated (n = 71), only 12 patients (16.9%) had contraindications to warfarin therapy. Patients treated with warfarin were younger than those who were not prescribed warfarin (71.3 versus 79.6 years, P<0.001). Aspirin was being prescribed for 21 patients (18.9%), primarily for previous myocardial infarction. Only five patients (4.5%) had ever had attempted cardioversion.*

Conclusion. *Atrial fibrillation is a common arrhythmia in general practice, and is commonly associated with hypertension, ischaemic heart disease and heart failure. There is a suboptimal application of standard investigations and use of antithrombotic therapy or attempted cardioversion; and few patients have presented to hospital practice. Guidelines on the management of this common arrhythmia in general practice are required.*

Introduction

ATRIAL fibrillation (AF) is the most common sustained disorder of cardiac rhythm. Estimates of its prevalence in the community vary widely around the world.[1-8] To date, British studies of the prevalence of AF in the community have involved small numbers of elderly patients from unrepresentative populations.[3-8] These British studies have concentrated only on reporting the prevalence or incidence, and have provided only limited descriptions of the aetiology, clinical features, investigation or treatment. There have been recent appeals for further information on the prevalence of AF in Britain, the prevalence of (and contraindications to) anticoagulant treatment, and the factors that influence doctors' decisions in treating AF, including the investigation of patients with this arrhythmia.[9] An understanding of these factors is required for healthcare provision, especially with regard to the optimum methods of investigation and a greater appreciation of the role of antithrombotic therapy.[9]

Two other studies have looked at the treatment of AF amongst acute medical admissions to hospital.[10,11] Both these studies have demonstrated that the application of standard investigations for AF is suboptimal and that there was a general reluctance to start oral anticoagulation or to consider cardioversion.[10,11] In addition, there is also considerable variation among clinicians in the clinical management of patients with AF.[12]

It is likely that GPs treat more patients with AF than do hospital general physicians, so we decided to investigate patients in two large general practices: first, to determine the prevalence of treated AF in a general practice population; secondly, to ascertain what use was made of local cardiovascular services; and finally, to examine whether patients were receiving optimal investigation or treatment.

Patients and methods

As many patients with known AF will be prescribed either digoxin, a betablocker, a class 1 or class 3 antiarrhythmic drug, verapamil or diltiazem, and aspirin or warfarin, patients aged over 50 years who are prescribed these drugs by their GP were

G Y H Lip, MD, MRCP, senior lecturer in medicine and consultant cardiologist; D J Golding, medical student; M Nazir, medical student; and D G Beevers, MD, FRCP, professor of medicine, University Department of Medicine, City Hospital, Birmingham. D L Child, MB, FRCGP, general practitioner, Cape Hill Medical Centre, Birmingham. R I Fletcher, MB, FRCGP, general practitioner, Lee Bank Medical Centre, Birmingham.
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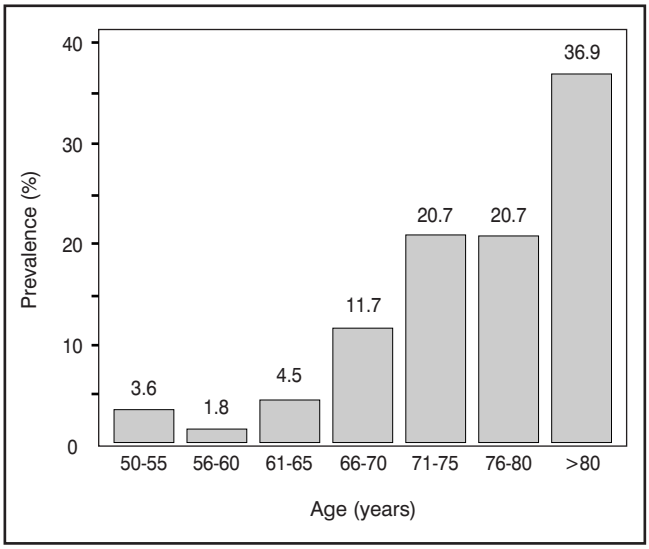

Figure 1. Age distribution of patients with atrial fibrillation in general practice.

chosen as our study population. We selected two general practices in the west of Birmingham in which practice computers were able to generate a list of all patients who were taking the drugs listed above. The general practice records of all patients who filled these criteria were carefully examined to find documentation of chronic AF, as defined by electrocardiography on at least two occasions, six months apart. Paroxysmal AF was defined as the presence of paroxysms of AF (≥10 beats) previously documented on 24-hour Holter monitoring, or alternatively by presentation to a GP or hospital with AF on two or more occasions, with subsequent reversion to sinus rhythm.

A standard proforma was completed, which contained information on aetiology, investigations and management. We also noted investigations done by the GP or hospital doctors (as documented in the hospital outpatient clinic or discharge letters), including thyroid function tests, serum digoxin levels, the last recorded blood pressure measurement, chest X-ray and echocardiography. The prevalence of hypertension was assessed by the previous diagnosis of this condition; the number of patients with a recent blood pressure reading of 160/90 mmHg or more was also noted. The number of patients with AF who had been admitted to hospital was recorded, as were the antiarrhythmic drugs the patients were receiving and whether they were treated with aspirin or warfarin. Contraindications to anticoagulation, if any, were also recorded; accepted contraindications to anticoagulation included dementia or frailty, dyspepsia, recent stroke (within the past three weeks), gastrointestinal bleeding, chronic renal failure, liver disease, recent surgery, and other bleeding disorders.

Results

Patient demography

Of the 111 patients aged over 50 years who were in AF (Table 1), 33 patients (1.9%) were found in one practice (1756 patients aged ≥50 years) and 78 patients (2.8%) from the other (2786 patients aged ≥50 years). Their mean age was 76.6 years (SD 9.1, range 50–105 years), with female patients being significantly older than males (unpaired *t*-test $P<0.001$). The increasing prevalence of AF with age is shown in Figure 1, with 41 patients (36.9%) who were older than 80 years. There was a higher proportion of female patients with AF than of females aged over 50 years among the total general practice population ($\chi^2 = 5.17$, $P<0.05$).

Of the 111 patients with AF, 86 (77.5%) were Caucasian, three (2.7%) were Afro-Caribbean, one (0.9%) was Asian, one (0.9%) was of mixed race, and in 20 cases there was no information of ethnicity in the records. Eleven patients (10.1%) with AF were smokers, 48 were ex-smokers (43.2%) and 28 were non-smokers (25.2%); there was no information on smoking status in 24 patients. As we did not interview individual patients, we did not have details on actual alcohol consumption.

Type of atrial fibrillation

Eighty-one patients (73%) had chronic AF while 30 (27%) had paroxysmal AF. There was no difference in the type of AF (chronic or paroxysmal) between male and female patients ($\chi^2 = 0.36$, P = not significant) (Table 1).

Associated conditions and complications

Hypertension was the most common associated factor for AF, being found in 41 patients (36.9%), based on diagnoses recorded in case records. However, 40 patients (36.1%) in the whole cohort had a last-recorded blood pressure measurement of >160/90 mmHg, but only 20 of these were recorded as having

Table 1. Atrial fibrillation in general practice.

Total general practice population studied	16 519		
Total general practice population aged >50 years	4 542	(27.5%)	
Total number of patients aged >50 years in atrial fibrillation	111	(2.4%)	
	42 male		69 female
Mean age (SD)	72.7	(9.9)	79.0 (7.7)
Chronic atrial fibrillation	32		49
Paroxysmal atrial fibrillation	10		20
Associated conditions with atrial fibrillation			
hypertension	41	(36.9%)	
ischaemic heart disease	32*	(28.8%)	
valvular heart disease	29	(26.1%)	
previous hyperthyroidism	17	(15.3%)	
alcohol excess	6	(5.4%)	
cardiomyopathy	6	(5.4%)	
sick sinus syndrome	3	(2.7%)	
atrial septal defect	1		

In 6 patients (5.4%), the medical records did not identify any aetiological cause for atrial fibrillation. Some patients had one or more possible aetiological factors. *Including 20 patients with a previous myocardial infarction.

had hypertension or were being treated for hypertension. Other associated cardiovascular conditions are summarized in Table 1. Sixty-three patients were known to have a clinical feature or complication commonly associated with AF: 34 patients (30.9%) had associated cardiac failure, 20 patients (18%) had a previous stroke, and nine patients (8.1%) had been diagnosed as having a transient cerebral ischaemic attack.

Investigations and management

Only 26 patients (23.4%) had had a chest X-ray (performed by GP or hospital) and only 20 patients (18%) had had an echocardiogram. Fifty-eight patients (52.3%) had had their thyroid function measured at some time. Only 34 of the 111 patients with AF (30.6%) had ever been admitted to hospital.

Patients with AF included 102 who were taking digoxin (91.9%), six who were taking a betablocker (5.4%; four were also taking digoxin), seven who were taking amiodarone (6.3%; six were also taking digoxin), eight who were taking verapamil (7.2%, including six on digoxin), and one patient (0.9%) who was taking flecanide (and digoxin as well). Out of 102 patients who were prescribed digoxin, only 40 (39.2%) had ever had their serum digoxin levels measured; however, 18.6% were taking 62.5 μg daily, 46% were taking 125 μg daily, and 31% were taking 250 μg daily.

Only 40 patients with AF (36%) were being treated with warfarin, although it was stated in the case notes that the warfarin was primarily for AF in only 20 patients (50%). By contrast, warfarin was prescribed in six patients (15%) for previous deep venous thrombosis, and in four patients (10%) for a prosthetic heart valve. Patients taking warfarin were younger than those who were not anticoagulated (71.3 years, SD 9.2 versus those not anticoagulated: 79.6 years, SD 7.5; unpaired *t*-test $P<0.001$). Anticoagulation intensity in the 40 patients was monitored by the GP alone in three cases (7.5%), by the hospital in 30 cases (75%) and by both GP and hospital in seven cases (17.5%). Of the 71 patients who were not anticoagulated with warfarin (64%), only 12 patients (16.9%) had any recorded contraindication (Table 2).

Only 21 (18.9%) of the 111 patients with AF were prescribed aspirin, and in seven (33.3%) this was primarily for a previous myocardial infarction. Thus, out of the total sample, there were 38 patients (34%) in whom antithrombotic treatment might have been indicated who did not receive either anticoagulation or aspirin. Only five patients (4.5%) in our study had had an attempted cardioversion. None of the patients in the survey had had pacemakers fitted or ablation procedures carried out.

Discussion

This study is limited by being a retrospective cross-sectional study of general practice case records and by its dependence upon cases of AF who were known to the general practices. A formal screening programme for AF among the 4542 patients aged >50 years in the two general practices would be time-consuming and limited by cost, manpower and non-attendance, as illustrated by one previous screening exercise in a general practice.[3] In addition, our dependence upon practice computer patient lists, based upon drug prescriptions, assumes that all patients with AF were taking some form of medication. We would therefore have missed a small number of patients aged <50 years and also those with AF who were not taking any drugs, or those who had not been diagnosed. It is likely that underdiagnosis would be a particular problem with paroxysmal AF, especially if patients had few symptoms and did not present to their GP. Some of these limitations may explain the minor difference in prevalence between the two general practices studied (1.9% versus 2.8%). Although we have also chosen two typical well-organized general practices in Birmingham that had practice computer drug lists, our population may not be generalizable to the population as a whole.

Nevertheless, this survey has identified the clinical features and complications in a general practice cohort of patients with AF, and the suboptimal application of standard investigations and antithrombotic therapy in such patients. The present survey of 111 patients with AF represents one of the largest reported cohorts in the British general practice setting. In addition, the present study was performed after recent trials have established the beneficial use of antithrombotic therapy as prevention against stroke and thromboembolism in patients with AF.[13]

The prevalence of AF in patients aged >50 years in a general practice population of over 16 500 people was found to be 2.4%. This figure is consistent with the prevalence reported by Hill *et al*,[5] but is lower than that reported among acute medical admissions to hospital.[10,11] In the present survey, hypertension was the most common associated cardiovascular condition, followed by ischaemic heart disease (IHD) and valvular heart disease. This is therefore consistent with epidemiological data from the Framingham survey;[14] however, in the hospital-based Glasgow survey of acute admissions with AF, IHD was the most common admission.[10] These differences may be a reflection of the fact that less than a third of the patients with AF had ever presented to hospital, suggesting that hospital-based surveys may grossly misrepresent the true prevalence and clinical features of AF in a population.[10,11,15] In addition, patients with AF and IHD might have been likely to have complications necessitating hospital admission.

This survey has confirmed previous observations of an increase in the prevalence of AF with age,[1,2] but in a British general practice population. We are only aware of three small studies in a British general practice setting. For example, Hill *et al*[5] screened a total of 819 patients aged >65 years in a single general practice population in Tamworth, and found 30 patients (3.7%) who were in AF. In the study by Camm *et al*,[4] only 106 patients were studied from a total of 268 patients aged ³75 years from a general practice in Sussex, with AF being documented in eight patients. Finally, a short report by Barnaby and Howitt[16] found only 76 patients with AF in a practice population of 13 200 (0.57%). In a recent audit of a general practice list of about 10 000 patients in Bollington, 67 patients were found to be in AF; this prevalence increased with age, rising from 1.5% in the sixth decade to 8% in the ninth (J R Coope, personal communication, 1995).[17]

It was surprising that over a third of patients with AF had a last-recorded blood pressure measurement of >160/90 mmHg; only a minority were recorded as having had hypertension. In addition, 30.6% of patients had associated cardiac failure. These observations are particularly important, since a history of hypertension or heart failure significantly adds to the risks of stroke and thromboembolism in AF.[18,19] The close association between AF and cerebrovascular disease is illustrated by the finding that nearly a fifth of patients in this survey had a previous stroke or transient ischaemic attack.

In the present survey, only 18% of patients had been investigated with an echocardiogram. Previous evidence from the SPAF study has demonstrated the importance of echocardiography in risk stratification for stroke; the presence of a dilated left atrium or cardiac impairment on echocardiography were independent risk factors for stroke and were additional to clinical risk factors such as hypertension, heart failure or previous stroke.[20] Echocardiography is also essential for defining patients with 'lone' AF. The low proportion of echocardiography per-

Table 2. Contraindications to anticoagulation among patients with atrial fibrillation.

Number of patients with atrial fibrillation	111
Number who were not anticoagulated	71
No contraindication to warfarin stated in clinical notes	54
Number with contraindications	12
Age	4
Dementia or frailty	3
Recent gastrointestinal bleeding	2
Dyspepsia	5
Chronic renal failure	1
Recent (<3 weeks) cerebrovascular accident or surgical procedures	0

Some patients had more than one contraindication.

formed on patients with AF reflects limited access by GPs to hospital echocardiography services. Open access echocardiography has been increasingly recommended by GPs for the investigation of heart failure, and there may be a strong case for extending this service to patients with AF. However, echocardiography is also an under-used investigation among hospital patients with AF, suggesting widespread suboptimal application of this important investigation.[10,11] Furthermore, only half of patients had a thyroid function test at any time. Thyroid disease is often under-recognized as an aetiological factor in AF, especially in the elderly where the clinical manifestations may be less obvious.[21]

Digoxin remains the most common drug prescribed for AF in general practice. This may partly be a reflection of prescribing habits in Britain. It is well-recognized that digoxin is useful in controlling the resting ventricular response in AF, but ineffective in rate control during exercise or in conditions of high sympathetic drive and in paroxysmal AF.[22,23] By contrast, digoxin is less popular in North America, where betablockers or calcium antagonists (verapamil or diltiazem) are used for rate control. Even in Britain, we have recently demonstrated considerable physician variation in the management of AF, with more consultant cardiologists than non-cardiologists undertaking investigations for AF and considering antiarrhythmic and anticoagulant therapy or cardioversion to restore sinus rhythm.[12] Suitable patients with AF should be considered for cardioversion to sinus rhythm in view of the demonstrable haemodynamic benefits and possible reduction in thromboembolic risk.[24]

In the present survey, we found that only 36% of patients with AF were being treated with warfarin, and of those not anticoagulated only a minority had any contraindications. This is despite recent clinical trials establishing the benefits of warfarin in preventing strokes in AF patients, with a risk reduction of approximately two-thirds.[13,19] However, anticoagulation usage appears to be better than in hospital-based reports[10,25] that were published before the recent randomized trials on anticoagulation in AF.[19] The suboptimal use of warfarin may reflect doubts whether evidence from the prevention trials applies to clinical practice because of the highly selected nature of the patient population in these randomized trials.[9,26] Patients taking warfarin in the present survey were younger than those who were not anticoagulated, although age alone should not be a contraindication to the use of warfarin in AF.[19] However, in the SPAF-II study, warfarin use was associated with an excess of intracranial haemorrhage in patients aged >75 years, thus reducing the benefits of thrombotic stroke reduction by warfarin.[27] Thus, a decision based upon risks and benefits is necessary, although, in a study using decision analysis techniques, the benefit for all patients with AF was substantial within a wide range of stroke risk rates applicable to ordinary clinical practice.[28] Increasing age means that the risks and benefits of treatment are more finely balanced, but recommending against the use of anticoagulation on the basis of age alone is inappropriate.[26,29]

Anticoagulation intensity was monitored by the GP in the minority of cases and by the hospital in the majority. The main concerns about warfarin use are the inconvenience of regular attendances at hospital anticoagulant clinics, and safety (owing to the small risk of bleeding associated with taking the drug). The safety problem has been shown to be related to high INR values and the stability of anticoagulant intensity.[13] It has previously been shown that anticoagulant monitoring by GPs is much better than that in hospital clinics,[30] and many patients prefer to visit their local GP rather than busy hospital clinics that may be far away. However, GPs do vary in their willingness to undertake anticoagulation monitoring; some practices do not even offer this service.[31] If more, better, and safer use of anticoagulation in patients with AF is intended, increasing provision of GP-based anticoagulation monitoring may become a necessary step.

In conclusion, AF is a common arrhythmia in general practice, and is commonly present in patients with hypertension, IHD and heart failure. There is a suboptimal application of standard investigations and use of anticoagulant therapy; and few have presented to hospital practice. Guidelines on the management of this common arrhythmia in general practice are required.

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Address for correspondence

Dr G Y H Lip, University Department of Medicine, City Hospital, Birmingham B18 7QH.