National survey of patients with AF in the acute medical unit: a day in the life survey

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Atrial fibrillation (AF) is the most common cardiac dysrrhythmia. The evidence base and expert consensus opinion for management have been summarised in several international guidelines. Recent studies suggest a disparity between contemporary practice and perceived best practice.

An electronic questionnaire was constructed to capture details of patient demographics and current practice, including risk assessment for stroke and major bleeding. All patients >18 years with AF as a primary or secondary diagnosis admitted from midday on the 14th September 2011 to midday on the 15th September 2011, were included in the survey. Participating units were recruited from the Society for Acute Medicine registry, and provided with an electronic link and password to enter data for individual patient episodes.

The electronic questionnaire was completed for 149 patient episodes from 31 acute medical units (AMUs) across the UK. The typical patient with AF presenting to the AMU is older, has important medical comorbidities (sepsis in almost a third) and frequently presents out of hours. Initial management was digoxin alone in 22% and 23% had a documented stroke risk assessment, not in-keeping with current guidelines.

This relatively simple methodology yields valuable insight into the real world management of AF, providing an additional evidence base.

Introduction

Atrial fibrillation (AF) is the most common cardiac dysrrhythmia, whose sequelae include stroke, heart failure and poor quality of life.[1] In parallel with an ageing population, the prevalence of AF is increasing, with persistent or permanent forms affecting 10–15% of the population over the age of 75 years.[2-6]

The effective management of AF has been a source of recurring debate, leading to the publication of combined American College of Cardiology/American Heart Association/European Society of Cardiology (ACC/AHA/ESC), and National Institute for Health and Clinical Excellence (NICE) guidelines in 2006.[7,8] In addition to evidence-based strategies for rhythm and rate control, an important issue addressed in these guidelines was that of thrombotic risk assessment and management. This was further prioritised in the 2010 ESC document.[9] Recent studies have suggested that both primary[10] and secondary[11] care may not follow guidelines for the management of AF.

Acute medical units (AMUs) represent the first point of assessment and care for the majority of medical inpatients. Hospital episode statistic data suggest that, of the 5,287,032 emergency admissions in England from 1st April 2010 to 30th March 2011, 57,898 (1.1%) had a primary diagnosis of AF.

The number of AMUs affiliated with the Society of Acute Medicine (SAM) has steadily increased since its inception in the millennium, and now stands at 220.[12] These units serve a substantive UK population base, creating considerable potential for collaborative research into current medical practice.

The Acute Medical Research Network of SAM, in association with the National Institute for Health Research Collaboration for Leadership in Applied Health Research and Care (NIHR CLAHRC) for Northwest London, commissioned a survey to examine contemporary management of AF within AMUs in the UK. We report the findings of this survey and its implications.

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Figure 1. Atrial fibrillation (AF) survey recruitment flow chart

Table 1. Survey cohort demographics

	Number (%)
Patients	149
Men/women	72 (48%) / 77 (52%)
Age ≥70 years	113 (76%)
Admission out of hours*	50 (33%)
Length of stay ≤24 hours	56 (38%)
Length of stay ≤72 hours	116 (78%)

* 18:30–08:00 (GMS 2004)

Table 2. Symptoms and atrial fibrillation (AF) status

Symptom	Number (%)
Asymptomatic	53 (36%)
Breathlessness	37 (25%)
Palpitation	24 (16%)
Neurological deficit	19 (13%)
Chest pain	17 (11%)
Newly diagnosed AF	34 (23%)
Paroxysmal AF	17 (11%)
Persistent AF	6 (4%)
Permanent AF	66 (44%)

Methods

An electronic questionnaire was constructed with fields including risk assessment for stroke and major bleeding, citing widely used scoring systems (**Appendix 1**).

All patients >18 years with AF as a primary or secondary diagnosis admitted over a specific 24-hour time period (midday on 14th September to midday on 15th September 2011) were included in the survey. Participating AMUs were provided with a link and password to enter data for each patient episode into the survey. Units were advised to nominate an individual to coordinate participation at a local level to prevent duplication of data entry.

Results

Of the 220 AMUs initially canvassed, 31 eventually provided patient data, representing a population base of more than seven and a half million adult UK residents (**figure 1**). The electronic questionnaire was completed for 149 patients (**table 1**). The symptom profile and AF status of the patients is displayed in **table 2**.

Associated diagnoses

Sepsis was the principal associated diagnosis present in almost a third, followed by heart failure and cerebrovascular events (**figure 2**). The hierarchy of associated diagnoses was different for the elderly, where cerebrovascular events ranked highest, together with sepsis and heart failure accounting for 70% of presentations (**figure 3**).

Cardiac investigations

In line with NICE guidelines, all patients received a resting 12-lead electrocardiogram (ECG). Abnormal QRS morphology, predominantly left bundle branch block, was noted in 17%, and repolarisation changes were seen in 13% (**table 3**).

Stroke risk assessment

Less than a quarter of the study population (23%) had any form of stroke risk assessment (NICE, $CHADS_2$, CHA_2DS_2-Vasc) (**Appendix 2**). Retrospective CHA_2DS_2-Vasc scores for those who were not risk stratified averaged 3.5, and the mean age of this subgroup was 77 years. Of note, 73 (80%) patients with a significant risk for thromboembolic stroke (retrospective CHA_2DS_2-Vasc score >2) were not prescribed anticoagulation therapy at time of discharge. The risk of stroke needs to be balanced with the risk of major haemorrhage. Despite this, only 36% (n=54) of patients with a CHA_2DS_2-Vasc score >2, had a HAS-BLED score of ≥3 (8.7 major bleeds per 100 patient-years). In addition, 24% (n=15) of patients at risk of major haemorrhage (HAS-BLED score of ≥3) were discharged on anticoagulation therapy. Four of this group were concomitantly discharged on antiplatelet therapy.

Initial AF treatment strategies

Rate control was the principal form of initial management, but one in five patients received digoxin alone (**table 4**).

Discharge planning, medication and follow-up

At the time of data collection, information was available for 99 discharged patients (**table 5**). One in five was offered inpatient or outpatient cardiology review and most were prescribed rate-limiting medication. Half were discharged on aspirin or clopidogrel, and a quarter on warfarin, with the remainder receiving neither an antiplatelet nor an antithrombotic agent.

Out of hours

In total, 49 (33%) of patients presented out of normal working hours (defined as from 6.30 p.m. to 8.00 a.m. on weekdays, the whole of weekends, bank holidays and public holidays).[13] Documentation of stroke risk was performed less frequently in patients who presented with AF out of hours, though this was not statistically significant (18.4% *vs.* 27.2%; Fishers exact p=0.29). Patients who presented with AF out of hours tended not to be discharged within 24 hours (28.6% of patients presenting out of hours *vs.* 45.7% of patients during normal working hours; Fishers exact p=0.06).

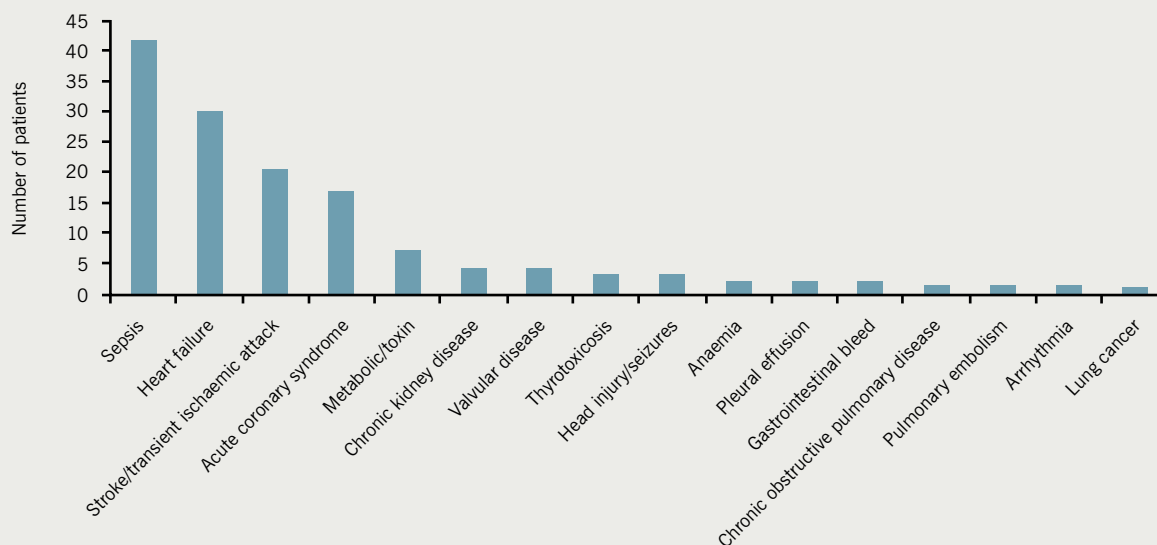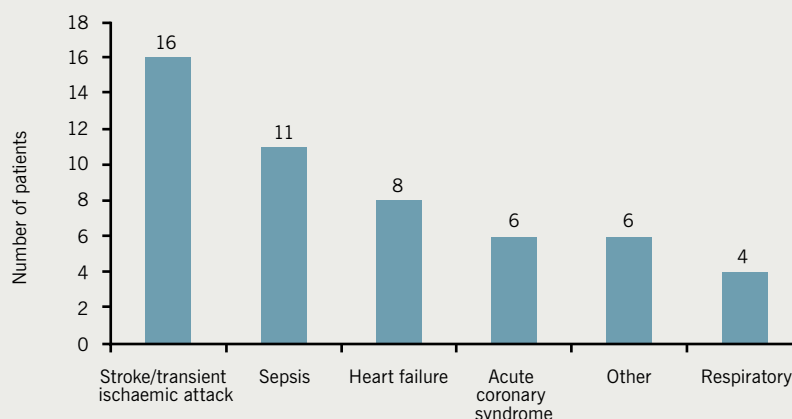**Figure 2. Diagnosis reported in association with AF**

Figure 3. Diagnosis reported in association with AF in patients aged 80–89 years

Discussion

The ideal database to study this population would contain the following features:

- Retain the ability for longitudinal study across primary and secondary care
- Continuous data collection direct from clinical records (less sampling bias and case ascertainment issues; reduce duplication/copy error)
- Embedded data validation processes
- Low cost (financial and human resource)
- Ability for rapid feedback to participating organisations
- Reproducible.

There is no existing database that fulfils all these parameters.

Clinical audits and registries have been successfully used to drive quality improvement. Routinely collected data (e.g. hospital episode statistics [HES]) have been used to explore trends in patient outcome. It is estimated that the average cost of running a national clinical audit is £250,000 per year. These audits have reasonably lengthy duration of set up, data collection and analysis, with consequent delay in feedback to participating Trusts. Poor coding practices have also given rise to doubt as to the accuracy of HES data.

We describe the piloting of an electronic survey driven, in part, by the expanding infrastructure of SAM. Our survey was designed to incur low cost and be quick to administer, facilitating rapid data analysis and feedback to participants. Additionally, the methodology allows for ease of replication, allowing time series data to be captured following local improvements. Two thirds of AMUs approached did not express interest in participation, and the eventual contribution rate was low at 14% of the total, but nonetheless, the population base accessed was considerable. We suggest that this model, readily adaptable to different conditions and presentations, has powerful potential as a research tool in acute medical practice.

Our survey suggests that the current management of individuals with AF in the

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Table 3. Cardiac investigations	
Investigation	**Number (%)**
12-lead electrocardiogram	149 (100%)
Abnormal QRS	19 (13%)
ST/T changes	25 (17%)
Inpatient echocardiogram	10 (7%)
Outpatient echocardiogram	39 (26%)

Table 4. AF treatment strategies	
Treatment strategy	**Number (%)**
Rhythm control	**17 (11%)**
DC cardioversion	8 (5%)
Pharmacological cardioversion	9 (6%)
Rate control	**81 (54%)**
Digoxin	33 (22%)
None	18 (12%)
Other*	2 (<1%)
Missing	17 (11%)
* Propranolol/carbimazole (1), permanent pacemaker implantation (1)	

Table 5. Discharge planning and review arrangements	
Arrangement	**Number (%)**
Inpatient cardiology review	35 (24%)
Discharge medication	
Beta blocker	49 (50%)
Rate-limiting calcium channel blocker	14 (14%)
Digoxin	12 (12%)
Warfarin	26 (26%)
Aspirin/clopidogrel	48 (48%)
Review arrangements	
Outpatient cardiology review	21 (21%)
Primary care review	38 (39%)
Other review	40 (40%)

acute medical environment is falling short of national standards[7-9] in a number of areas (**Appendix 3**).

First, in only a minority did the extended clinical assessment include echocardiography when that information was not already available. Second, a thromboembolic risk assessment was recorded for less than one in four patients. Patients with intermittent or sustained non-valvular AF have similar risks of thromboembolic events.[14] Previous studies[15] have shown considerable variation in decision-making processes between clinicians with regards to stroke and bleeding risks, as well as choice of antithrombotic therapy, leading to significantly different treatment choices. Findings from RealiseAF, a cross-sectional, international study of >10,000 patients seen over 800 sites, demonstrated that of patients with a CHA_2DS_2-Vasc score meeting criteria for anticoagulation, the percentage of patients actually receiving anticoagulation were 37.7%, 54.4% and 59.0% for paroxysmal, persistent and permanent AF, respectively.[16]

Reasons for recalcitrance in antithrombotic therapy in the elderly (who paradoxically are at higher risk of thromboembolic events) stem from safety concerns relating to the risk of falls and major bleeding.[17] Several large randomised-controlled trials[18,19] have confirmed the efficacy and safety of antithrombotic therapy in this population. The recent systematic review and health economics model of Hughes et al.[20] demonstrated that stroke risk stratification models were able to discriminate between different categories of stroke risk (at least 95% confidence interval), and that anticoagulation of high-risk patients was cost-effective. Balancing the risk of stroke in AF with that of major bleeding, Pisters et al.[21] have devised a novel bleeding risk score (**Appendix 4**), which was validated by Lip et al.[22] on a large patient cohort from the Stroke Prevention Using an Oral Thrombin Inhibitor in Atrial Fibrillation (SPORTIF) III and V trials.

Third, digoxin was the first choice for rate control. Rate control with digoxin is as effective as beta blockers or calcium channel blockers for control of ventricular rate at rest. Beta[23] and calcium channel blockers,[24] however, have the added advantage of providing effective rate control in exertion (hyperadrenergic state).[7,25] In addition, beta blockers have proven efficacy if the patient suffers from concomitant ischaemic heart disease, and diltiazem has

been shown to be superior to digoxin in acute AF.[26] It is also important to note that while rate control in permanent AF provides alleviation of symptoms, it does not reduce thromboembolic risk.

Fourth, although not expressly stated in the guidelines, but recommended by inference, four out of five patients did not receive a cardiology opinion. EuroHeart, a large scale study (n=5,333) of ambulatory and hospitalised patients with AF seen in cardiology centres across 132 countries demonstrated excellent outcomes.[27] Of note, a relatively high proportion of this population (34%) underwent cardioversion at enrolment and 94% had an echocardiogram at least once over the course of a year.

The survey's demographic findings are in keeping with previous epidemiological data suggesting a higher prevalence of AF in the elderly.[28] The typical patient also frequently presents out of hours. Accordingly, the most relevant specialties, cardiology and stroke medicine, are unlikely to be involved in initial, or indeed downstream, management. The primary focus for acute medicine is often an important associated or precipitating diagnosis, such as sepsis. This is in contrast to other national and international studies of AF where chronic comorbidities are more frequently reported, often in ambulatory settings.[29]

Other management challenges for the acute medical environment include potential hypotensive and negative inotropic effects of beta and calcium channel blockers. ECG monitoring may be standard in acute medical units, but is not commonly accompanied by the nurse to patient ratios that would support aggressive cardiovascular management. In contrast, one study demonstrated that metoprolol was frequently prescribed (in 67.6% of cases) to patients treated for AF in emergency departments within the UK.[30]

Where acute medicine could undoubtedly improve is in the assessment of thromboembolic risk, particularly with the availability of CHA_2DS_2-Vasc, a rapid user-friendly scoring system with prognostic power. This said, taking the time to assess risk and translate this to treatment may be challenging in high intensity, rapid turnover units.

Within the different setting of general practice, the percentage of patients prescribed anticoagulants increased from 20 to 34% in men and 17 to 25% in women over four years.[31] It is worth noting that general practice databases also hold a large amount of valuable information. This information may be selectively harnessed to aid anticoagulation decision making by using tools such as GRASP-AF. When used alongside data from the Global Anticoagulation Registry in the Field (GARFIELD), an international registry of patients with AF at risk of stroke, GRASP-AF may improve anticoagulation uptake for appropriate patients in the acute medical setting.[32]

We recognise that this study design has a number of limitations. It is a measurement at a single point of time, with little facility to compensate for variation. It consists of self-reported data, with no ability for external validation. The need to distinguish zero admissions from non-participation became evident at the end of the pilot, as did the need for contextual data (e.g. size of AMU). The dataset is rich with clinical information and process measures, but the design makes clinical outcome measures difficult to measure. Relatively low participation rates limit generalisability of the results.

Despite this, we suggest that this relatively simple study offers valuable insights into the real world management of an important and common condition, and highlights the challenges faced in delivering best evidence into practice, particularly within an acute medical setting ●

Acknowledgements

Conflict of interest

Disclaimer

Key messages

- The first national survey examining the management of atrial fibrillation (AF) within acute medical units in the UK

- Almost a quarter of patients with permanent AF were prescribed digoxin as initial monotherapy. The rationale for this treatment decision was only documented in a third of cases and was not in keeping with national standards

- Stroke risk score was infrequently documented (23%) and retrospective analysis suggests 80% of patients with a significant risk for thromboembolic stroke (CHA_2DS_2-Vasc score >2) did not receive anticoagulation

- Real world practice differs from national recommendations, further work examining barriers to implementation is crucial

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Appendix 1. Electronic questionnaire fields

1. Admission time		13. Hypertension?	
2. Demographics	Age Gender	14. Precipitants	Sepsis ACS
3. Presentation	Symptomatic AF AF + tachycardia AF + heart rate <90 Other	15. Initial treatment	Flecainide DC cardioversion Rate control Anticoagulation
4. Symptoms	Palpitation Chest pain Breathlessness Asymptomatic Other	16. Digoxin	Monotherapy?
5. Other diagnoses	Heart failure Stroke PTE Sepsis Unclear Other	17. Discharge treatment	Home Ward
6. Previous episodes	Symptomatic Tachycardia	18. Follow-up	GP Cardiology Other
7. Classification	New Paroxysmal Persistent Permanent Unclear	19. Stroke risk	
8. Current treatment		20. Stroke risk score	
9. Previous treatment		21. CHA_2DS_2-Vasc	
10. Laboratory results		22. Anticoagulation	Inpatient Community
11. ECG		23. Cardiology	
12. Echo evidence	Previous Inpatient	24. HASBLED Score	
		25. Length of stay	

Key: ACS = acute coronary syndrome; AF = atrial fibrillation; DC = direct-current; ECG = electrocardiography; PTE = pulmonary thromboembolism

Appendix 2. Thromboembolic risk assessment			
NICE	**High**	**Moderate**	**Low**
	stroke/TIA/embolism ≥75 + HT/DM/vasc HF/abnormal TTE ↓ Warfarin	≥65 + °risk factors <75 + risk factors ↓ Warfarin *vs.* aspirin	<65 + °risk factors ↓ Aspirin

Key: HT = hypertension; DM = diabetes; vasc = vascular disease; HF = heart failure; TIA = transient ischaemic attack; TTE = echo

CHA_2DS_2-Vasc

C	heart failure		+1
H	hypertension		+1
A_2	age	65–74 +1, ≥75	+2
D	diabetes		+1
S_2	stroke		+2
-Vasc	vascular disease		+1
Female			+1

Score ≥2
↓
Warfarin

Appendix 3. Core recommendations for the management of AF: NICE, ACC/AHA/ESC, ESC	
Essential management	
12-lead ECG	all
Clinical assessment	all; exclude thyrotoxicosis
Transthoracic echocardiogram	all
Thromboembolic risk stratification	all
AF management priorities	
Acute onset AF (<48 hours)	restore sinus rhythm
Paroxysmal AF	restore/maintain sinus rhythm
Persistent AF	balance rhythm *vs.* rate control
Permanent AF	rate control
Anticoagulation	
Address thromboembolic risk, including heparin in acute onset AF	
Anti-arrhythmic medication	
First rank	beta blockers, rate-limiting calcium channel blockers
Second rank	structurally normal: sotalol, class 1c agents structural abnormality: amiodarone
Digoxin as adjunct, or monotherapy in sedentary patients	

NICE – National Institute for Health and Clinical Excellence 2006

ACC/AHA/ESC – American College of Cardiology / American Heart Association / European Society of Cardiology 2006

ESC – European Society of Cardiology 2010

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Appendix 4. Major bleeding risk		
HAS-BLED	Hypertension history	+1
	Renal disease	+1
	Liver disease	+1
	Stroke history	+1
	Prior major bleeding or predisposition to bleeding	+1
	Labile INR	+1
	Age ≥65	+1
	Medication usage predisposing to bleeding	+1
	Alcohol usage history	+1
	Score ≥3	
	↓	
	8.7 major bleeds per 100 patient-years	

Key: INR = international normalised ratio