The prevalence, characteristics, associated comorbidities and medical management of patients with atrial fibrillation in a tertiary setting in the Western Cape

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ABSTRACT

Introduction: The prevalence of atrial fibrillation (AF) in high-income countries is high, with less known about low- to middle-income countries. Information on the patient profile and application of adequate guideline-directed management in this low-middle income setting is lacking. This study aimed to determine the prevalence, clinical profile and management of patients with AF across all disciplines in a tertiary setting, and to compare the management of these patients with current guidelines.

Methods: Electrocardiograms (n = 13 414) recorded at Tygerberg Hospital for patients > 18 years between 1 July 2018 – 30 June 2019 were screened and medical records reviewed.

Results: An AF prevalence of 3.4% (n = 460) was found, which corresponded to 341 patients and 238 complete medical records. The mean age was 65.4 (±13.9) years and the most prevalent comorbidities reported were hypertension (63.9%, n = 152) and diabetes mellitus (21%, n = 46). Valvular heart disease was found in 31.1% (n = 74). In 80.7% (n = 192) of patients anticoagulation was indicated; however, only 65.1% (n = 125) of those indicated received it, mostly with warfarin. Time in therapeutic range (TTR) was poor (26.5%). Rate control (< 110 bpm), was seen on 80.9% (n = 372) of ECGs and beta blockers were most frequently used for rate control (65.1%, n = 155). No patients had documented information indicating that they received medical or interventional rhythm control management.

Discussion: The AF prevalence and patient profile resemble those of patients in high-income countries. Slightly more than half of patients qualifying for anticoagulation received this with warfarin, with suboptimal TTR. Rate control strategies were somewhat reassuring; however, the lack of early rhythm control may be disadvantageous to our patients.

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INTRODUCTION

Atrial fibrillation (AF) has a worldwide prevalence of 3%–5% in adults above the age of 20 years and is present in 1 out of 10 people over the age of 75 years.[1,2] The rising prevalence of AF globally can be attributed to ageing populations, an increase in AF-associated co-morbidities and lifestyle-associated risk factors.[1,2] In addition, as mandated in updated guidelines, improvements in screening and detection of silent or asymptomatic AF in these high-income settings yield higher prevalence rates.[2] In low- to middle-income countries such as South Africa (SA), the prevalence of AF ranges from 4%–8%.[1,2,4,5] The main risk factors for development of AF globally and in sub-Saharan Africa are hypertensive heart disease (HHD), valvular heart disease (VHD) and cardiomyopathy. Prevention through management of comorbidities and strategies to improve lifestyle are lacking globally and locally.[1,2,4,5] All studies in the low-middle income group reported sub-optimal prophylactic anticoagulation and low uptake of rhythm control strategies.[1,2,4,5]

Management of AF is aimed at (1) assessing stroke risk and providing appropriate anticoagulation for the prevention of thromboembolic events, (2) rate and rhythm control and (3) managing associated cardiac conditions, comorbidities and lifestyle-associated risk factors.[1,2,6,7] At the time of the study, the South African Heart Association used the 2020 European Society of Cardiology (ESC) guidelines for the management of AF, developed in collaboration with the European Heart Rhythm Association (EHRA) to guide patient management.[1,2] The majority of patients treated in the public healthcare sector in SA

come from a lower socio-economic background and this, together with resource limitations within this sector, may challenge the applicability of these international guidelines. Furthermore, little is known about the local adherence to international guidelines across a wide range of disciplines.

The aim of this study was to determine the prevalence, patient clinical profile, and management of patients with AF in a tertiary setting in the Western Cape and to compare this management with current recommended international guidelines.

METHODS

An observational, descriptive study using a retrospective record review was performed. Tygerberg Hospital (TBH) is a tertiary referral hospital with ±1 400 beds situated in the Western Cape, SA. All in- and out-patient ECGs are performed by a central ECG service and recorded on the MUSE® system between 1 July 2018–30 June 2019 were reviewed and adult patients with AF were included. Once an ECG was identified as AF, the medical records were reviewed and demographic and clinical data recorded for each patient. Only medical records corresponding to the date of the ECG captured were included. In the case that an ECG was not associated with a hospital admission, the clinical records closest to the date of the ECG were recorded. Medical records were obtained from the hospital's medical records systems (Enterprise Content Management [ECM®], National Health Laboratory Services [NHLS, Trackcare®] and Echo Pack®). Time in the therapeutic range (TTR) for those patients on vitamin K antagonists, was calculated by the simplistic formula of the total number of INR values in the range over the total number of INR measured as described by Reiffel (2017).[8] Good rate control was assessed as resting heart rate < 110 bpm.[4] Ethics approval from Stellenbosch University Health Research Ethics Committee (U19/10/043) as well as institutional approval was obtained.

RESULTS

A total of 13 414 ECGs captured from 1 June 2018 – 30 June 2019 at TBH across all disciplines were screened and 460 were identified as AF, giving an AF prevalence of 3.4%. These 460 ECGs corresponded to 341 patients, as more than one ECG was recorded for some patients. Full medical records were available for 69.7% of these (n = 238). The mean age was 65.4 (±13.9) years. Females made up 52.5% (n = 179) and males 47.5% (n = 162).

All ECGs were standard (25 mm/s, 10 mm/mV, 50 Hz) and the rhythm identified was irregular, in keeping with AF, except for 5.9% (n = 27) that were paced rhythms and 1.4% (n = 5) that had complete heart block. The ECG characteristics of patients with AF are summarised in Table I.

Unfortunately the type or characteristics of AF was not documented accurately in the medical records. Documented symptoms associated with AF included shortness of breath (8.8%; n = 21), angina (7.6%, n = 18), palpitations (4.6%; n = 11), syncope (3.4%; n = 8), fatigue (2.5%; n = 6), dizziness (1.3%; n = 3) and anxiety (0.4%; n = 1).

The most commonly associated cardiac conditions reported in the medical records or found on echo are presented in Figure 1. Of the patients with VHD, mixed mitral valve disease (MMVD) (7.1%; n = 17) and mitral regurgitation (MR) (6.7%; n = 16) were most common (Figure 2).

Other coexisting cardiovascular conditions not seen in Figure 2 included hypertrophic cardiomyopathy (HCM) (1.3%; n = 3), infective endocarditis (< 0.8%; n = 2), restrictive cardiomyopathy (0.4%; n = 1), and corpulmonale (0.4%; n = 1).

TABLE I: ECG characteristics of cases with AF (n = 460).

ECG Characteristics	Mean ± SD
Ventricular rate (bpm)	87.30 ± 25.4
QRS duration (mS)	109.1 ± 27.2
QTc duration (mS)	450.5 ± 39.1
	% (n)
QRS axis	
Normal	78.5 (361)
Left axis	16.7 (77)
Right axis	3.00 (14)
North West axis	1.70 (8)
Wide QRS	
LBBB	11.7 (54)
RBBB	8.3 (38)
Non-specific intraventricular conduction delay	1.50 (7)
Complete heart block with ventricular escape	1.40 (5)
Paced rhythm	5.90 (27)
Chamber enlargement	
LVH	11.1 (51)
RVH	0.70 (3)
Pathological Q-waves	22.6 (104)
Location of pathological Q waves	
Inferior	13.7 (63)
Anteroseptal	7.20 (33)
Septal	4.10 (19)
Anterolateral	0.90 (4)
Repolarisation changes	
ST Elevation	26.7 (123)
ST Depression	17.0 (78)
Peaked T waves	33.0 (152)
Inverted T waves	29.1 (134)
Flattened T waves	1.10 (5)

ECG: Electrocardiogram, bpm: beats per minute, mS: milliseconds, LBBB: left bundle branch block, RBBB: right bundle branch block, LVH: left ventricular hypertrophy, RVH: right ventricular hypertrophy.

Comorbidities found in this group included hypertension (63.9%; n = 152), diabetes mellitus (DM) (20.6%; n = 46), obesity (16.0%; n = 38), chronic kidney disease (CKD) (9.2%; n = 22), pulmonary hypertension (8.4%; n = 20), chronic obstructive pulmonary disease (COPD) 8.0% (n = 19), 3.8%; (n = 9) hypothyroidism and 2.5%; (n = 6) hyperthyroidism, peripheral vascular disease (1.2%; n = 3), gastro-oesophageal reflux disease (0.4%; n = 1), and liver disease (0.4%; n = 1).

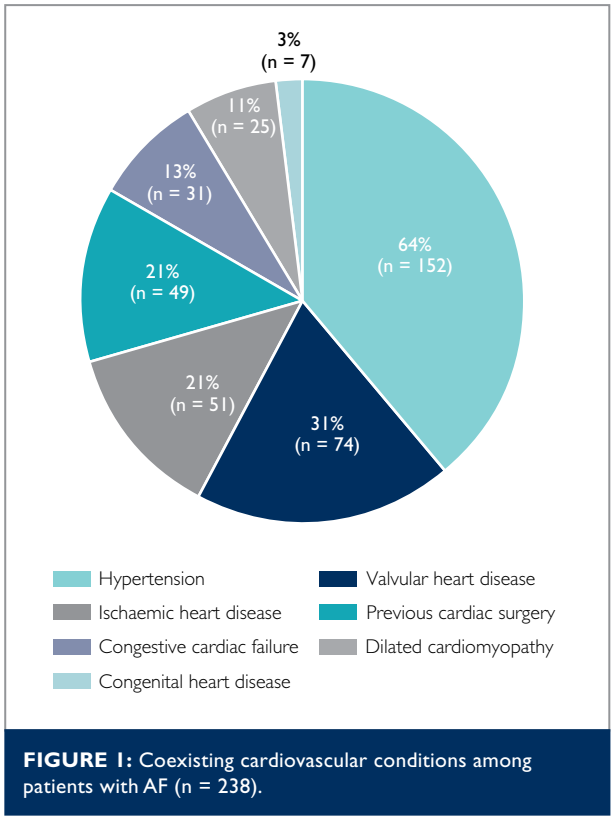

FIGURE 1: Coexisting cardiovascular conditions among patients with AF (n = 238).

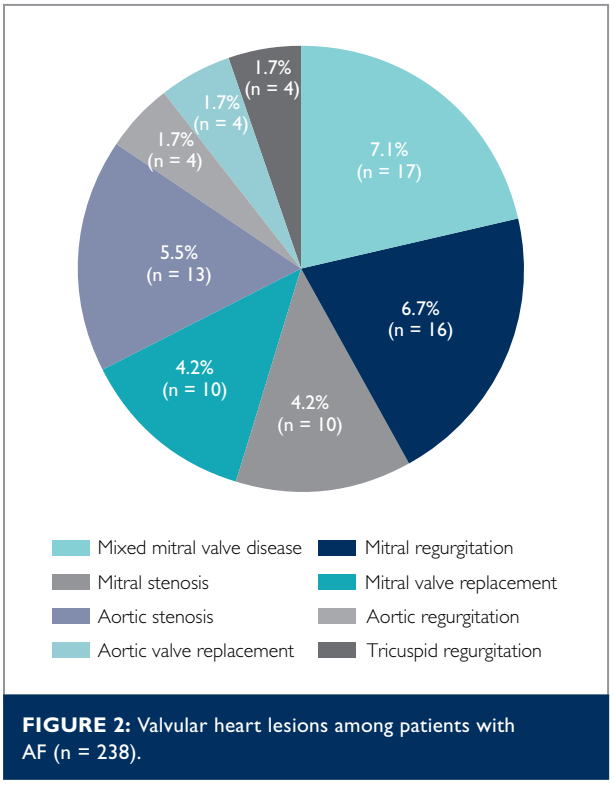

FIGURE 2: Valvular heart lesions among patients with AF (n = 238).

Associated lifestyle-related risk factors such as smoking (30.1%; n = 73) and notable alcohol use (> 3 drinks for females and > 4 drinks for males) (8.4%; n = 20) were documented, with obstructive sleep apnea, vigorous exercise and substance abuse not reported in the clinical records.

Echocardiography data was only available for 20.2% (n = 48) of patients and is shown in Table II. Most patients had non-dilated left ventricles with a mean ejection fraction (EF) of 49%. MR was the most common valvular lesion recorded (48.0%; n = 23), followed by aortic regurgitation (AR) (16.7%; n = 8). Stenotic lesions were less prevalent, with aortic stenosis (AS) present in 6.3% (n = 3) and mitral stenosis (MS) in 4.2% (n = 2).

Previous stroke was reported in 5.0% (n = 12) of patients. Information regarding risk and management of thromboembolism is summarised in Table III. Of the 238 patients, 80.7% (n = 192) qualified for oral anticoagulation (OAC) (CHA2DS2-VASc for males > 1 and females > 2). Of these 192 patients qualifying for anticoagulation, 65.1% (n = 125) received vitamin K antagonists (VKA) (warfarin) and only 3 (1.6%) were on a novel oral anticoagulation (NOAC) drug (rivaroxaban). Of these, 49.5% (n = 95) also received concomitant antiplatelet medication and in 18.8% (n = 36) only antiplatelet medication was given even though there was an indication for anticoagulation. Of the patients who received warfarin (n = 125), the mean international normalised ratio (INR) was 2.2 ± 1.3. However, 48.9% (n = 65) had subtherapeutic INR levels (1.4 ± 0.3) and 21.1% (n = 28) INR values >3 (4.1 ± 1.5), while TTR were 0.3 ± 0.2 (26.5%). The HAS-BLED score was approximated using hypertension as a surrogate for absolute blood pressure values and a mean HAS-BLED score of 1.6 ± 0.9 was found. However, 18.1% (n = 43) of patients had a HAS-BLED score > 3.

The mean ventricular rate for the cohort was 87bpm (Table I). 80.9% (n = 372) of patients had good rate control (< 110) as read from the ECGs (n = 460). Rate control drugs included beta-1 selective blockers such as atenolol (45.0%; n = 107) and non-selective beta blockers such as carvedilol (20.2%; n = 48). Only 3.8% (n = 9) of patients received antiarrhythmic medication such as amiodarone. Non-antiarrhythmic drugs with antiarrhythmic benefit were commonly used, with drugs such as angiotensin-converting enzyme (ACE) inhibitors (enalapril), HMG-CoA reductase inhibitors (simvastatin) and aldosterone receptor antagonists (spironolactone) being prescribed (Table IV).

Additional medication taken that is not listed in Table IV included tricyclic antidepressants (amitriptyline 6.3%; n = 15), nitrates (isordil 3.8%; n = 9), thyroid medication (levothyroxine 2.9%; n = 7), selective-serotonin reuptake inhibitors (citalopram 1.2%;

TABLE II: Echocardiogram results of patients with atrial fibrillation who underwent echocardiography during their hospital stay (n = 48).

Description	Mean ± SD	Median (25th,75th)	Reference value[10]
IVSd	1.3 ± 1.8	1.0 (0.8;1.0)	0.6 - 1.1cm
LVIDd	5.2 ± 1.1	5.1 (4.4;6.0)	3.8 - 5.8 cm
LVIDs	4.7 ± 5.0	4.0 (3.2;4.8)	2.0 - 4.0 cm
LVPWd	1.1 ± 1.0	0.9 (0.8;1.0)	0.6 - 1.1 cm
LVEF	49.0 ± 13.2	50.0 (35.0;60.0)	52% - 75%
LA diameter	4.5 ± 0.8	4.4 (4.0;5.1)	3.0 - 4.0 cm
RVOT diameter	4.2 ± 4.7	3.2 (2.7;4.0)	1.0 - 5.0 mm
LA area	28.4 ± 10.5	27.9 (22.1;34.3)	≤ 20.0 cm^2
RA area	23.0 ± 7.1	21.7 (18.7;27.7)	≤ 18.0 cm^2
MV EA	0.9 ± 0.3	0.9 (0.8;1.1)	< 1.3 m/s
E/e'	13.7 ± 8.2	11.8 (8.2;14.7)	< 8.0 normal > 15.0 dysfunction
LVOT VTI	14.7 ± 5.2	14.4 (10.7;17.1)	18.0 - 22.0 cm
TRPG	28.0 ± 12.1	27.8 (22.3;36.6)	17 - 57 mmHg
RAP	9.8 ± 5.6	10.0 (5.0;15.0)	2.0 - 6.0 mmHg
RVSP	40.2 ± 13.1	41.0 (28.0;51.5)	15 - 25 mmHg

IVSd: Interventricular septum thickness at end diastole, LVIDd: left ventricular internal diameter end diastole, LVIDs: left ventricular internal diameter end systole, LVPWd: left ventricular posterior wall end diastole, LVEF: left ventricular ejection fraction, LAD: left atrial diameter, RVOT: right ventricular outflow tract wall thickness, LAA: left atrial area, RAA: right atrial area, MV EA: mitral valve inflow, E/e-: E velocity, early mitral inflow velocity to early diastolic mitral annulus velocity ratio, LVOT VTI: left ventricular outflow tract velocity time integral, TRPG: tricuspid regurgitation maximum pressure gradient, RAP: right atrial pressure, RVSP: right ventricular systolic pressure.

TABLE III: Patients qualifying for anticoagulation (n = 191) receiving either anticoagulation / antiplatelet therapy and thromboembolic risk determined by INR.

	CHA2DS2-VASc	Warfarin	Warfarin + Antiplatelet	Antiplatelet only	INR on OAC		
	% (n)	% (n)	% (n)	% (n)	mean ± SD	INR < 2 % (n) mean ± 4SD	INR > 3 % (n) mean ± 4SD
All	80.3 (192)	65.1 (125)	49.7 (95)	18.8 (36)	2.2 ± 1.3	48.9 (65/133) 1.4 ± 0.3	21.1 (28/133) 4.1 ± 1.5
Males ≥ 1	77.9 (88)	62.3 (55)	59.1 (52)	19.3 (17)	2.2 ± 1.5	57.6 (34/59) 1.4 ± 0.3	20.3 (12/59) 4.4 ± 2.1
Females ≥ 2	83.2 (104)	67.3 (70)	50.9 (53)	18.3 (19)	2.3 ± 1.1	41.2 (31/74) 1.3 ± 0.3	21.6 (16/74) 3.9 ± 1.9

Antiplatelet includes aspirin or clopidogrel only as well as dual antiplatelet (dual AP) with aspirin and clopidogrel, INR: international normalised ratio, OAC: oral anticoagulation included warfarin and rivaroxaban, SD: standard deviation, TTR: time in therapeutic range.

n = 7) and xanthine oxidase inhibitors (allopurinol 2.0%; n = 5).

DISCUSSION

Data analysis yielded an AF prevalence which is in keeping with published international data[1,2,5,6] but slightly lower than what was found among cardiology admissions in the Heart of Soweto (HoS) study and recent reviews of data from low-middle income countries, including sub-Saharan Africa.[7-9] The clinical profile (age, gender distribution) of patients with AF in this cohort is similar to high income populations, where there has been an increased prevalence among older patients and patients with co-morbidities.[2,5,6] A less pronounced female predominance was seen in this study, compared to other.[7-9]

Congestive cardiac failure (CCF), cardiomyopathies, and VHD are independently associated with AF and are present in more than a third of patients with AF.[5,6] VHD specifically is associated with less favorable outcomes and increased stroke risk.[1,2,5,6] The prevalence of MS and mechanical valves in this cohort was lower than reported in the HoS study.[7] However, this is not surprising as this study reports on all patients with AF while the HoS study

TABLE IV: Management of patients with AF (n = 238).

Drug category	Drug	% (n)	Dose (mg) Median (min, max)
Anticoagulation	Warfarin	52.5 (125)	5 (5, 10)
	Rivaroxaban	1.30 (3)	15 (15, 20)
	Clexane	2.90 (7)	80 (40, 80)
Antiplatelet	Clopidogrel	9.70 (23)	75 (75, 150)
	Aspirin	31.1 (74)	150 (150, 750)
Rate control	Carvedilol	20.2 (48)	12.5 (3.125, 25)
	Atenolol	45.0 (107)	50 (25, 150)
	Digoxin	7.60 (18)	0.25 (0.125, 0.25)
	Verapamil	1.70 (4)	100 (40, 120)
Antiarrhythmic drugs (AAD)	Flecainide	0	-
	Sotalol	0	-
	Amiodarone	3.80 (9)	200 (200, 200)
Non-AAD with antiarrhythmic benefit	Enalapril	50.4 (120)	10 (2.5, 25)
	Losartan	5.90 (14)	50 (5, 50)
	Simvastatin	47.1 (112)	20 (5, 80)
	Spironolactone	15.1 (36)	25 (25, 80)
Treatment of cardiac risk factors and comorbidities	Hydrochlorothiazide	6.70 (16)	12.5 (12.5, 25)
	Furosemide	45.0 (107)	40 (20, 120)
	Metformin	12.6 (30)	850 (500, 1 000)
	Insulin	2.90 (7)	50 (20, 50)
	Lansoprazole	13.9 (33)	20 (20, 40)
	Amlodipine	15.1 (36)	10 (5, 10)

looked at patients referred to a cardiology service.

Patients in this cohort had similar comorbidities to those seen in high-income countries, and included hypertension, DM, obesity, and CKD. Associated lifestyle risk factors such as notable alcohol use and smoking were also common, highlighting the need for treatment and control of comorbidities as well as lifestyle changes.

The 2020 ESC guidelines, and the more recent 2024 update, provide an excellent framework for the approach to and management of patients with AF. The "CC to ABC" in the 2020 guidelines is a comprehensive approach to better outcomes in patients presenting with AF, including guidelines to confirm and characterise AF, assess the need for and initiate OAC, achieve better symptom control and aggressive management of comorbidities. The importance of a shared decision making process with the patient is also highlighted.[2]

All the patients in this study had clinical atrial fibrillation diagnosed on a 12 lead ECG. Characterising AF in this cohort was difficult due to reliance on somewhat incomplete patient record keeping.

Patients in this cohort had a significant thromboembolic risk that was not well managed with anticoagulation. Although the prevalence of stroke was lower in this group than what is reported in international literature, especially in high-income countries,[1,2,5,6] the thromboembolic risk was high based on the calculated CHA2DS2-VASc score. Anticoagulation is recommended irrespective of the type of clinical AF. In addition, the HAS-BLED score should be calculated before commencement of anticoagulation therapy.[2] These assessments should be formal, structured and documented and those with increased risk should be assessed and followed up more frequently.[2] The assessment and documentation of both these scores were poor in the current study and was calculated by the principal author from the available data.

The mean INR for our cohort falls within the target therapeutic range for patients receiving VKAs. However, almost half had subtherapeutic levels, which increases the risk for stroke and some had levels associated with an increased risk of bleeding. These varied INR levels could be due to the fact that these values may have been taken close to the initiation of treatment, when values are known to still be unstable, or patient factors such as not taking the medication as prescribed, not adhering to dietary guidelines, and poor compliance with regular monitoring of INR levels. Due to this variation in INR values, the TTR was

also calculated. This is a popular way of reporting management of patients on anticoagulation with VKAs and is very useful as a quality indicator at INR clinics. The TTR in this study was significantly lower (26.5%) than reported in bigger trials (65% ENGAGE-AF, 64% RE-LY, 62% ARISTOTLE and 58% ROCKET AF).[3] The ESC recommends patients with a TTR < 70% be switched to NOAC therapy, or to improve TTR on VKA with intense counselling and more frequent INR checks.[2] In our setting, the low number of patients found to be in the therapeutic range could be overcome by appropriate and timeous adjustment of the warfarin dose, patient and physician education, and the possibility of prescribing NOAC medication. NOACs have been shown to be non-inferior to and safer than VKA and are recommended specifically before and after cardioversion.[1,2] Nevertheless, in this setting, the NOACs remain an expensive alternative, which has precluded their use. A formal cost analysis and evaluation of TTR for patients on warfarin is recommended to further evaluate the cost-effectiveness and potential clinical benefit of making NOACs more readily available to state patients. This is an area that should be researched, especially now that there are generic NOACs available at a lower cost.

Patients in this cohort were still commonly receiving antiplatelet medication and, in many cases, patients received only aspirin or dual antiplatelet therapy when anticoagulation was clearly indicated. A high percentage of patients also received antiplatelet treatment as an adjunct to OAC. In terms of AF management, the use of antiplatelet agents alone is ineffective and is not recommended to prevent thromboembolism. The combination of anticoagulation and antiplatelet agents is not recommended for routine management of AF due to the increased risk of bleeding and intracranial haemorrhage.[2] However, it may be required in patients who had a previous stroke or recent myocardial infarction. Due to the retrospective nature of the study and reliance on medical records, there is no certainty whether this was prescribed in the setting of previous CVA on warfarin or due to a recent myocardial infarction or just incorrectly prescribed.

Left atrial (LA) appendage occlusion (LAAO) is an alternative to OAC in patients where these drugs are contraindicated, due to the decreased bleeding risk with this strategy. In our cohort, no patients were referred for LAAO. This may be due to the fact that this remains an expensive intervention which requires trained operators to perform. The procedure has only been offered at TBH since November 2016 and the low number of patients referred may also be due to lack of physician awareness.

The ESC recommends that patients are treated with adequate rate and rhythm control strategies and highlights that patient preference as well as modification of lifestyle factors are paramount in order to improve outcome.[2] Although rate control was achieved in half of the patients in this cohort, poor rhythm control efforts were noted. Rate control was achieved with the prescription of mostly beta blockers such as atenolol and carvedilol, achieving target or lenient ventricular rates as described in the RACE II study (< 110 bpm),[4] well within ranges reported by studies in other sub-Saharan African countries (65% – 95%).[8]

Rhythm control can be achieved by cardioversion, antiarrhythmic medication or catheter ablation. Antiarrhythmic medication (e.g. amiodarone) may be given for rhythm control in order to improve quality of life[1,2,5,6] but it was seldom used in this study and other antiarrhythmic drugs such as flecainide and sotalol were not used at all. The low use of these drugs can be improved on in this setting to enhance guideline-directed management.[2] Other options when medical treatment fails, such as cardioversion and catheter ablation, were not noted in this study. AF catheter ablation only became available at TBH from October 2020 and would explain why this was not used, but it remains unclear why cardioversion was not documented in a single patient. This data might be inaccurate as we do not have information on what type of AF the patients had or whether they had previously been cardioverted or referred later, outside the window that we evaluated, as such information was limited by the retrospective nature of this study. Cardioversion is safe, easy, and is recommended as first-line treatment for paroxysmal and persistent AF without major cardiac risk factors and after failed or intolerant use of class I/II antiarrhythmic drugs for patients who have had their coagulation risk assessed.[2]

Non-antiarrhythmic drugs with antiarrhythmic benefit such as enalapril, simvastatin and spironolactone were given frequently. However, most of the patients received these drugs as part of treating other comorbidities and not to improve the treatment of AF, nevertheless providing dual benefit.

The ESC 2020 guidelines focus on risk factor management and lifestyle changes in order to decrease the prevalence of co-morbidities in patients with AF.[1,2] These include guidelines on obesity and weight loss, using alcohol and caffeine in moderation, and regular physical activity.

Documentation of lifestyle counselling was poor, possibly due to the retrospective nature of the study. A strong emphasis on physician education, patient counselling, adherence and inclusion of the multidisciplinary team in management of patients with AF is recommended to achieve a patient-centred, holistic and consistent approach, leading to improved quality of life and longevity in patients with AF.

LIMITATIONS

The authors acknowledge the limitations of a retrospective study design. This includes missing important data that was not captured, and reliance on the accuracy of information in medical notes and reports. Other significant limitations of this study besides those inherent to a retrospective record review include the fact that this record review reflects a "snapshot" in the patients' clinical course. Further prospective data on the patients' management and outcome would provide valuable information. The very low number of echocardiograms recorded is also disappointing. The reasons for this remain unclear. It is possible

that these patients may have had echocardiogram performed outside of the study period that were not recorded in the clinical notes or available on Echo Pack®. Although it is a strength of this study that we included all patients admitted to hospital in the time period and not only those admitted to cardiology service, a clear distinction of the number of patients in each department would have provided interesting data and added value.

CONCLUSION

This study showed an AF prevalence which is in keeping with international data. The patient profile in our cohort matched that of high-income countries, with a similar age, gender and comorbidity profiles.

The striking deviation from guideline-directed therapy in our cohort was the poor prescription of OAC in patients where it was clearly indicated, and the low number of patients having INR values within the therapeutic range on VKAs. In addition to this, the wide use of antiplatelet agents deviates significantly from current guidelines and needs to be addressed. While rate and rhythm control are both acceptable strategies to treat AF symptoms and preserve left ventricular function, rhythm control is recommended for improved symtom control and quality of life. The low uptake of rhythm control strategies in this study provides room for improvement in their management. Physician education and early referral to the cardiology service could address both of these problems. It is also standard practice that all newly-diagnosed patients with AF should undergo echocardiography, which was not the case in the present study where only patients admitted to cardiology had echocardiography. Patient preference and inclusion in the management plan should also be addressed as well as improvement in adequate documentation of screening, assessment, risk-factor stratification and management of patients with AF.

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