

## Original Article

### Frequency of atrial fibrillation and atrial high rate episodes in Sudanese patients with dual chamber pacemakers

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#### Abbreviations

**AF** Atrial fibrillation

**AHRE** Atrial High Rate Events

**bpm** beats per minute

**CIED** Cardiovascular Implantable Electronic Devices

**DDD** Dual Chamber

**ECG** Electrocardiogram

**EGM** Intracardiac electrocardiogram

**PPM** Permanent Pacemaker

**VVI** Ventricular demand pacing

## **Abstract**

### **Background**

AF is the most common arrhythmia in clinical practice, especially in elderly patients.

The clinical presentation and detection of AF is challenging in patients with CIEDs. Regular screening for AHRE during routine interrogation CIEDs is of great importance.

### **Objectives:**

To study the prevalence of AF and AHRE in patients with implanted dual chamber pacemakers and the risk of thromboembolism and bleeding from anticoagulation.

### **Methods:**

All adult patients with DDD pacemaker who presented to the pacemaker clinic for pacemaker interrogation in Al Shaab Teaching Hospital and Sudan Heart Center from March 2016 to September 2016 were screened for AF using baseline ECG , interrogation for AHRE and analysis of EGM when available.

### **Result:**

A total 56 patients were included, most of them above 65 years and M:F was 1:1.

One patient had permanent AF. AHRE was detected in 18 patients with only 3 patients with device EGM confirming AF . Symptoms were detected in 33% patients.

The mean CHADS2-VASc was 2.7 (+/- 1.8) and the mean HAS-BLED score was 1.7(+/- 1.3).

**Conclusion:**

AF and AHRE detected using surface ECG, EGM or AHRE algorithm is common in our study population with the significant risk of thromboembolism with low risk of bleeding from anticoagulation.

**Introduction**

AF is the commonest arrhythmia detected in man with a huge burden of disease worldwide (1). It is associated with significant morbidity and mortality from stroke and heart failure as well as impaired quality of life (2)(3).

Patients with CIEDs represent a great opportunity to screen for AF during interrogation. Presence of atrial leads will allow to detect

AHRE which are present in 10-15% of patients with pacemakers (4). AHRE are associated with prevalence of frank AF and thromboembolic complications, though less than patients with established AF and not all AHREs are AF (5). Two ongoing trials may provide definitive evidence on the benefit of oral anticoagulation in patients with AHRE; Apixaban for the Reduction of Thrombo-Embolism in Patients With Device-Detected

Sub-Clinical Atrial Fibrillation (ARTESiA) and Non vitamin K antagonist Oral anticoagulants in patients with Atrial High rate episodes (NOAH – AFNET )(6,7).

### **Objective**

To study frequency of established atrial fibrillation and AHRE in patients as well as risk of thromboembolism and bleeding from anticoagulation in a sample of Sudanese patients with dual chamber pacemaker.

### **Methods**

This is a hospital based cross-sectional prospective and retrospective study conducted from March 2016 to September 2016. All patients with DDD PPM at Al Shaab

Teaching hospital and Sudan Heart Center pacemaker clinics , both located in Khartoum, Sudan were included. Patients younger than 16 years or do not consent to the procedure were excluded.

Patients records and baseline ECGs were reviewed. PPM interrogation for AHRE, defined as atrial rates > 180 bpm and lasting > 5 min , as adopted by European Society Cardiology 2016 guidelines for Atrial fibrillation , was performed. Risk for thromboembolism and bleeding risk was assessed using CHADS<sub>2</sub>vasc score and HASBLED score respectively(8).

Data was computerized and analyzed using statistical package of social sciences (SPSS version 21).

Ethical approval was obtained from Sudanese Medical Specialization Board (SMSB), Al Shaab Teaching Hospital and Sudan Heart Center .

### **Results:**

A total of 56 patients with dual chamber pacemakers were included in the study with a mean of duration 42.6 months since implantation. Age distribution is shown in figure 1 and the male to female ratio was 1:1.

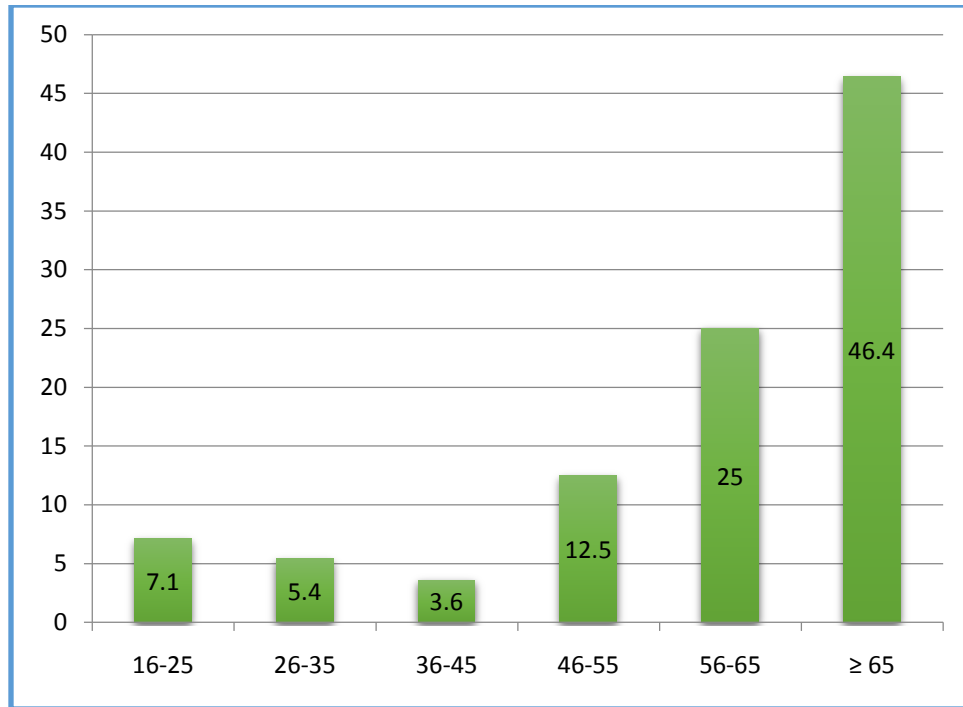
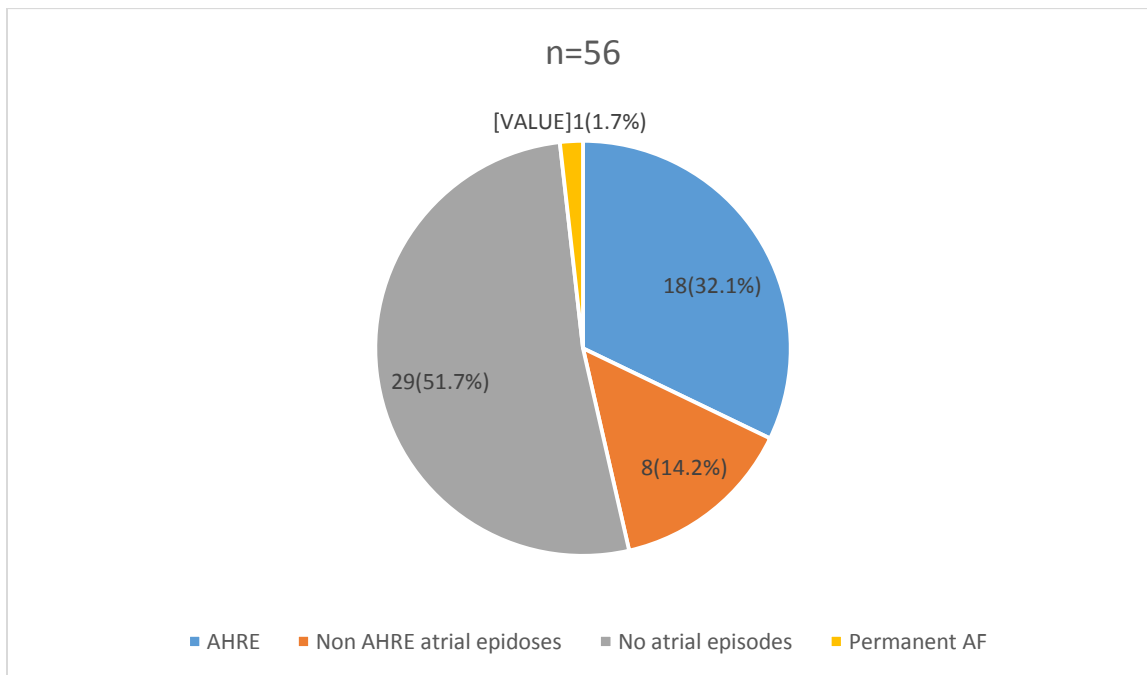


Figure (1) Distribution of study sample according to age. n= 56

The indications for PPM implantation were high grade block in 89% of patients and sick sinus node in 11%.

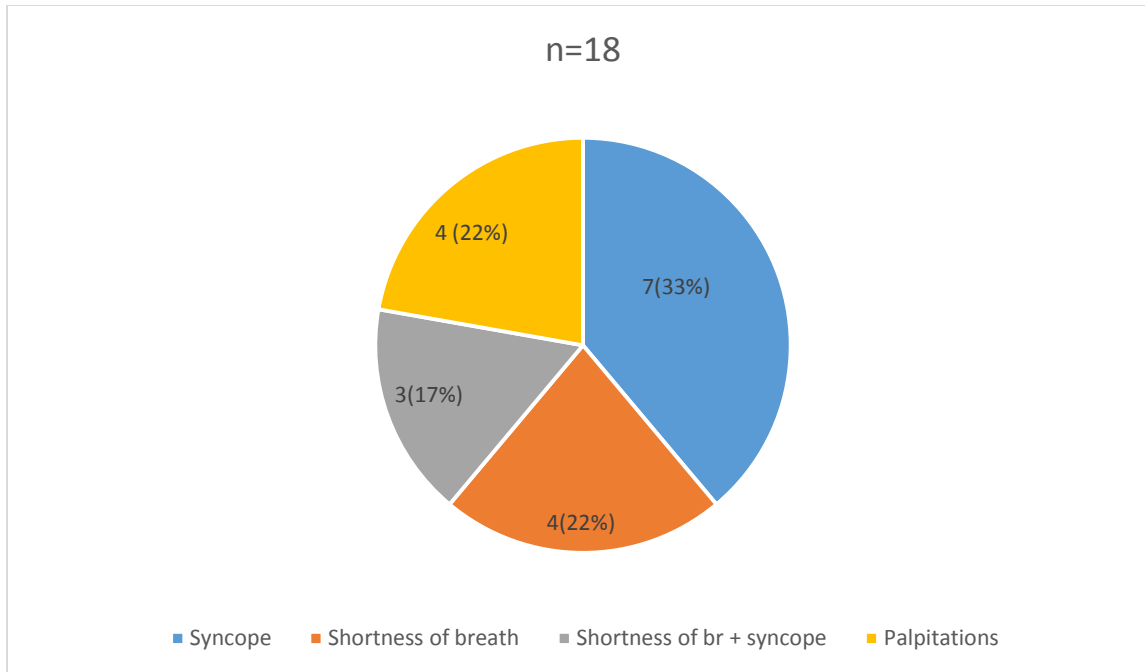
The total number of patients who have AF or AHRE analyzed by all methods was 19 (33.9%) . One patient (1.7%) developed permanent AF , confirmed on resting ECG, and pacing mode was switched to VVI. The total number of patients who developed AHRE ( $\geq 180$  bpm,  $> 5$ min) during interrogation were 18 (32.1%). Atrial episodes of  $< 180$  bpm or  $< 5$  min were detected in 8(14.2%), patients and 29 (51.7%) had no episodes detected. Figure (2) shows distribution of atrial episodes in study cohort.



**Fig(2). Distribution of detected AF and AHRE in study cohort. AF = atrial fibrillation; AHRE = atrial high rate episodes**

Only 3 (5.4%) had available EGM during episodes and met criteria for AF. During interrogation, the median number of episodes of AHRE was 533.4+/-1729.90 .

Only 33% of patients developed symptoms. Fig (-) shows distribution of symptoms



**Fig (3) Distribution of symptoms with AHRE. AHRE: Atrial high rate episodes**

The mean CHADS2-VASc score for patients with AHRE was  $2.7 \pm 1.81$  and the mean HAS-BLED score was  $1.7 \pm 1.34$ .

## DISCUSSION

The study was conducted in two large cardiac centers in the capital Khartoum with experienced staff in device implantation and interrogation.

In our study most of the patients were above 65 years and the commonest indication was high grade block and this similar to other published data in low and middle income countries (9).

Only a minority of our study sample with AHRE developed symptoms, the commonest being syncope, and this is similar to a study done by Quirino et al in Italy and showed only 20% of their sample are symptomatic (10)



In our study 32.1% developed significant AHRE which is higher than reported literature of 10-15 % and only 3 patients with AHRE had EGMs recorded by their device and this is similar to published data (4). Still most are asymptomatic and hence the importance of routine follow-up for such episodes.

As per ESC 2016 guidelines for AF, patients with AHRE ( > 180 bpm , > 5-6 min) should have AF verified by resting ECG , device EGM or other rhythm monitoring devices as well as risk for stroke assessed using CHADs-VASc score (6). Our patients had only resting ECG done for AF detection.

An average CHADS2-VASc score of 2.7+/-1.8 makes our study population at significant risk for thromboembolic complications. This is similar to data by Arce et al and Gonzalez et al (11,12). At the same time bleeding risk from oral anticoagulants in our study sample seems to be low with an average HAS-BLED of 1.7+/-1.34.

## **Conclusion:**

AF detected using surface ECG, EGM or suspected due to AHRE algorithm is common in our study population with significant risk of thromboembolism and low risk of bleeding from anticoagulation.

## **Limitations**

The main limitations of our study is inability to definitively verify af in patients with AHRE with device

EGMs or long-term rhythm monitoring.

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