

diagnostic yield for cardiac disease. Exclusion of these ECG parameters from the Group 2 category in asymptomatic athletes would reduce the false positive rate from 10% to an acceptable <3%.

063 **SEX AND ETHNICITY SPECIFIC ECG DIFFERENCES IN ELITE ATHLETES: RELEVANCE TO PRE-PARTICIPATION CARDIOVASCULAR EVALUATION: THE BRITISH EXPERIENCE**

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Purpose The athlete's ECG is affected by several demographic factors but there is a paucity of data relating to the impact of the athlete's sex and ethnicity. The ESC guidelines for ECG interpretation in athletes are derived predominantly from male cohorts. Extrapolating such criteria to athletes of African/afro-Caribbean origin and female athletes may lead to erroneous interpretation.

Methods Between 2001 and 2011, 1378 highly trained athletes (55% males, 81% Caucasian) (mean age 21.6 ± 5.43 years); range 14–35 years, underwent cardiac evaluation including 12-ECG and echocardiography. ECGs were analysed for training related (group 1) and training-unrelated (group 2) changes, according to the ESC guidelines.

Results Males demonstrated a higher prevalence of Group 1 (89% vs 61%; $p < 0.0001$) and Group 2 ECG changes (26% vs 16%; $p = 0.0001$) compared with females. Of the group 1 changes, isolated left ventricular hypertrophy (42%), early repolarisation patterns (ST elevation > 0.1 mV) (61%), first-degree AV block (10%) were more prevalent in males compared to 14%, 45% and 4.7% females respectively ($p = 0.0001$). Of the group 2 changes, T-wave inversion in leads V1-V4 were more prevalent in female athletes (12%) particularly black females (17%) compared to male athletes (4%; $p = 0.0001$), whereas, T-wave inversion in the inferior leads were more common in males (3.3% vs 0.6%) irrespective of ethnicity. Males demonstrated a higher prevalence of axis deviation (6.7% vs 2.1%; $p = 0.0001$), atrial enlargement (4.2% vs 1.0%; $p = 0.0002$) and right ventricular hypertrophy (RVH) (8.3% vs 2.6%; $p = 0.0001$) compared with females. Caucasian athletes exhibited greater group 1 changes compared with black athletes (73% vs 65%; $p = 0.0161$). Black athletes exhibited a higher prevalence of group 2 ECG changes compared with Caucasian athletes (34% vs 21%; $p < 0.0001$) with 15% of black athletes exhibiting T-wave inversion, 4.5% left atrial enlargement 14% right atrial enlargement and 12% demonstrating RVH compared to 9%, 0.9%, 0.09% and 4.1% of Caucasian athletes respectively. There was no correlation between any ECG parameter and cardiac chamber size.

Conclusions Male sex and black ethnicity equated to a higher prevalence of Group 1 and 2 ECG changes compared with female sex and Caucasian ethnicity. However, anterior T wave inversion was significantly more common in females, being present in over 10% of athletes irrespective of ethnicity than previously reported. The precise incidence and significance of anterior T-wave inversion in female athletes requires further assessment.

064 **PREVALENCE AND MORPHOLOGICAL CHARACTERISATION OF EARLY REPOLARISATION PATTERNS IN YOUNG HEALTHY INDIVIDUALS: IMPACT OF GENDER, ETHNICITY AND PHYSICAL ACTIVITY**

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Introduction Early repolarisation (ER) is commonly observed in athletes and young healthy individuals. Recently, ER in the inferior

and lateral leads has been associated with sudden cardiac arrest from idiopathic ventricular fibrillation. We studied the prevalence, distribution and morphology of ER patterns in inferior and lateral leads in young healthy individuals.

Methods 12-leads ECG was performed at rest in 1237 young healthy individuals (age range 13–38 years) between February 2011 and September 2011. We evaluated the impact of gender, ethnicity and physical activity on ER. Individuals were divided into physically-active (exercise > 2 h/week) and sedentary. Early repolarisation was defined as notched or slurred J-point elevation of at least 0.1 mV from baseline, in ≥ 2 contiguous inferior or lateral leads; anterior ER patterns were not considered in this study. The morphology of ST-segment was classified as horizontal/descending or rapidly ascending/up sloping.

Results The mean age of participants was 18.2 ± 4.3 years, of which 979 (79%) were male, 981 (79%) were physically active and 91% were Caucasians. ER pattern was present in a total of 232 (18.7%) cases; of these 42% were in the inferior leads, 31% in lateral leads and 27% in both. Notched ER was more prevalent (64% inferior, 83% lateral, 76% infero-lateral) compared to slurred morphology, and more commonly associated with ascending/upsloping ST-segment elevation. ER was significantly more prevalent in males compared to females (20% vs 12%, $p = 0.003$), in physically-active people compared to sedentary (20% vs 13%, $p = 0.0194$), and in Afro-Caribbeans compared to Caucasians (40% vs 17%, $p = 0.0013$). In addition, voltage criteria for left ventricular hypertrophy and sinus bradycardia were a common associated finding in individuals with ER pattern compared with those without ($p = 0.0001$ and 0.002 respectively). Only 5% of individuals with ER had J-point elevation of > 0.2 mV.

Conclusion Early repolarisation is a common finding in young healthy individuals, and is more prevalent in males, physically-active individuals and those with Afro-Caribbean ethnicity. Notched ER with ascending ST-segment elevation in inferior leads was the most commonly observed morphological pattern. More research is required to understand precise long-term implications of such repolarisation changes in young individuals.

065 **ATRIAL FIBRILLATION ABLATION IN A DISTRICT GENERAL HOSPITAL: 3 YEARS EXPERIENCE**

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Introduction The practice of atrial fibrillation (AF) ablation is increasing exponentially. At present, these procedures are performed in a small number of surgical tertiary centres. In order to meet the growing demand it will be necessary to expand this service. We sought to assess patient satisfaction, procedural success and complication rates for AF ablation performed via a newly established district general hospital (DGH) service.

Methods We prospectively surveyed patients undergoing AF ablation, between November 2007 and November 2010, at Eastbourne DGH. Patient symptoms were assessed before and at least 12 months after AF ablation by telephone questionnaire, procedural satisfaction was also assessed. Procedural details (procedural time, fluoroscopy time, ablation technique) and complications were all accurately recorded for every case.

Results In 278 patients 314 procedures (average 1.13 procedures/pt) were performed (160 for persistent AF [PersAF], 134 for paroxysmal AF [PAF]). Mean age 63.8 ± 10.7 years, 70% male. Of the PAF cases 75 procedures were performed with the PVAC (Medtronic, USA) and 56 with the Mesh (Bard, USA) catheter. The remaining three

PAF procedures were performed with LASSO, Artic front cyroablation balloon and the Amigo robot (Catheter Robotics, Inc.) and weren't used in the analysis. Mean procedural time was 107.9 ± 35.9 min, fluroscopy time was 32.1 ± 11.3 min. Both measures were significantly shorter in the PVAC PAF group ($p < 0.001$ for both). Mean hospital stay was 0.84 ± 0.6 bed days. Mean follow-up time was 529 ± 187.54 days. Subjective freedom from AF recurrence for all cases was 61%; for PAF PVAC 80% ($p < 0.05$), for PAF Mesh 54% and for PersAF 59%. 76% reported some symptom improvement. 86% of patients were highly satisfied with the procedure. Major complications included: stroke in three patients (0.95%), TIA in 1 patient (0.32%), pericardial tamponade in four patients (1.27%), significant pulmonary vein stenosis in one patient (0.32%) and phrenic nerve palsy in two patients (0.64%).

Conclusion Our 3 year experience shows that AF ablation can be safely performed in a DGH settings with high procedural success rates and low complication rates. There was no need for acute surgical intervention in any of our cases.

066 ANTI-THROMBOTIC THERAPY AND ATRIAL FIBRILLATION IN SCOTLAND: RESULTS OF A NATIONAL AUDIT

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Introduction and Methods GP practices across Scotland were invited to participate in an audit of the management of atrial fibrillation (AF) as part of a national audit of Clinical Standards in Heart Disease by Health Improvement Scotland. A primary care database interrogation tool was developed to identify patients with AF, extract relevant data and calculate a CHADS₂ score for each patient.

Results 248 practices with a total practice population of 1376834 contributed data. 19470 patients with AF were identified (prevalence 1.4%) including 18165 patients with non-valvular AF. The majority of patients with non-valvular AF (56%) were in a high risk group for stroke (CHADS₂ ≥ 2) and the most prevalent risk factors overall were age ≥ 75 (55%) and hypertension (56%). Formal stroke risk assessment was rarely recorded in primary care (<1%). 79% of patients with AF were prescribed some form of anti-thrombotic therapy, either anti-platelet or warfarin (Abstract 066 table 1).

In the high risk group (CHADS₂ ≥ 2) not on warfarin, a minority of patients had recorded exclusion criteria for warfarin (10%). In patients with non-valvular AF who had a prior history of ischaemic stroke or TIA, less than half (44%) were on warfarin.

Conclusion In Scotland, patients with AF are not receiving anti-thrombotic therapy according to guidelines. Patients at high risk of stroke are undertreated with warfarin and those at low risk of stroke are over prescribed warfarin. Strategies to improve appropriate anti-coagulant use in this group include routine use of simple stroke risk stratification.

Abstract 066 Table 1

Stroke risk	No. of patients with AF (% of total)	No. on anti-platelet (% of group)	No. on warfarin (% of group)	No. on warfarin and anti-platelet (% of group)
CHADS ₂ = 0	3136 (16)	1019 (32)	791 (28)	78 (3)
CHADS ₂ = 1	5338 (28)	2039 (38)	1829 (35)	211 (4)
CHADS ₂ ≥ 2	9691 (56)	3778 (39)	3967 (41)	567 (6)

067

ANTICOAGULATION IN PATIENTS WITH ATRIAL FIBRILLATION AND A PERMANENT PACEMAKER REMAINS POOR AS GENERAL PRACTITIONERS ARE NOT INFORMED OF THE ARRHYTHMIA

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Introduction Electrocardiographic recognition of the underlying rhythm in patients with a permanent pacemaker can be very difficult. Atrial fibrillation/flutter in particular might go unreported and the paced rhythm can obscure recognition of atrial arrhythmias by the General Practitioners (GPs). Furthermore, in our region, pacing clinics are often run at the hospital independently of GPs, even if the patients are no longer followed-up in the cardiology outpatient clinic. Identification of new Atrial Fibrillation/Flutter might not be communicated adequately to GPs, therefore depriving patients from appropriate anticoagulation.

Methods We retrospectively reviewed records of 282 patients who attended routine outpatient pacing clinics in our institution over a 2-month period and identified patients with atrial arrhythmias suitable for anticoagulation. We considered all patients with persistent Atrial Fibrillation/Flutter or paroxysmal Atrial Fibrillation/Flutter >30 min (all 4 groups referred to as AF in the text) with a calculated CHA₂DS₂-Vasc ≥ 2 as eligible for anticoagulation. The electronic records and/or case notes were reviewed establishing whether the patients were anticoagulated and whether GPs had been informed of the diagnosis of AF.

Results 282 cases (men=124) were reviewed and 95 patients (33.7%) were noted to have AF (men=40, age median=83, mean CHA₂DS₂-Vasc=3.7). 72 patients (75.8%) had persistent AF/Flutter and 23 patients (24.2%) had paroxysmal AF/Flutter. For 24/95 (25.3%) patients, AF was first identified after pacemaker implantation at a routine pacing check and the GP (or cardiologist) had not been informed of this diagnosis. Therefore, these patients were never considered for anticoagulation. 44/95 (46.3%) were anticoagulated with warfarin and 13/95 (13.7%) were unable to take or refused warfarin due to: frequent falls (3), general fragility (1), dementia (1), gastric cancer (1), gastric bleed (1), subdural haematoma (1), hepatocellular carcinoma (1), dual antiplatelets for coronary stents (1), and due to patient refusal (3). There was no significant difference in informing GPs between paroxysmal and persistent AF/Flutter (χ^2 $p=0.16$), men and women (χ^2 $p=0.25$).

Conclusions We have shown that it is very common to identify AF following pacemaker implantation and the incidence of AF in patients with permanent pacemakers is much higher than historical age-matched population (33.7% vs 10.0%). Anticoagulation in this group remains sub-optimal. Up to 25.3% of the patients are found to have AF suitable for consideration of anticoagulation, however this information is not passed to the GPs for further action. A routine pacing clinic review offers an ideal opportunity for identification of AF. Liaising with the GP however, is essential to optimise anti-coagulation uptake in this population.

Abstract 067 Table 1

Total patients reviewed in pacing clinic	282	
Patients with AF	95	33.7%
Patients on warfarin	44	46.3%
Patients who were considered inappropriate/declined warfarin	13	13.7%
Patients where GP had been informed at any stage (before or after implant) of AF	14	14.7%
Patients where the GP was never informed (and never considered for anticoagulation)	24	25.3%