SUMMARY

Background: Reliable ECG-LAA criteria might offer a simple and inexpensive way to predict the risk of ischemic stroke in addition to echocardiographic LA assessment

Purpose: show the relationship between electrocardiographic left atrial abnormality (ECG-LAA) and ischemic stroke, especially whether ECG-LAA provides additional information to that provided by echocardiography.

Methods: A case-control study included 50 patients with first ischemic stroke and 50 age-, gender-, and race/ethnicity-matched community control subjects. All the patients underwent complete history and examination, resting ECG, resting echocardiographic examination, CT or MRI, and laboratory tests.

Results: There was no statistically significant difference between the studied groups according to their mean age [stroke Group mean age was 61± 10 years versus 63± 9years in control Group). (P=0.23)]. Female subjects were found to represent 46% of the study population (total 46 females and 54 males) distributed almost equally among the study groups [stroke group included 24 females (48%), control group also included 22 females (44%)],and when comparing the two groups as regard sex there was no significant statistical differences(p=0.68) .There were no statistically significant differences between the study groups regarding DM, smoking , obesity , the presence of congestive heart failure and coronary artery disease. However, there were statistically significant differences between the study groups regarding hypertension [34 patients in stroke group (68%) versus 20 patients in control group (40%), (P = 0.005)*] and hypercholesterolemia[19 patients (38%) versus 10 patients (20%) in control group(P < 0.05)]. *Table (11) and Figure (32)*.

There was no statistically significant difference among the study groups regarding ejection fraction in (%) [57.14 ± 9.94 in stroke group, 60± 9.1 in control group, (P>0.05)], and the presence of left atrial enlargement by echocardiography , however, stroke group included significantly higher number of patients with left ventricular hypertrophy detected by echocardiography than control group {33 patients in stroke group (66%) versus 19 patients in control group (38%), (P < 0.05)}.There were statistically significant difference among the study groups regarding interventricular septal thickness in mm [11.9 ± 2.1 in stroke group, 10.7 ± 1.45 in control group, (P<0.05)] and left ventricular internal diameter in mm during diastole and in systole [LVIDd was 48.4 ± 6.4 in stroke group versus 44.7 ± 5.9 in control group while LVIDs was 33.8 ± 7.0 and 30.5 ± 5.6 in stroke and control groups respectively (P<0.05)].There were high statistically significant difference among the study groups regarding LA diameter in mm [(39.8 ± 4.8 and 37.1± 5.3 in stroke group and control group respectively) (P=0.007)] , Left ventricular posterior wall thickness diameter in mm [(11.9 ± 2.1 and 10.7 ± 1.45 in stroke group and control group respectively) (P=0.001)], LV mass in grams [(230.0 ± 69.2 and 182.0 ± 50 in stroke group and control group respectively) (P=0.002)],and LV Mass index (gm/m²) [(133.0 ± 40.0and 105.2 ± 29.4 in stroke group and control group respectively) (p = 0.002)]. *Table (12)*

There were no statistically significant differences among the study groups regarding P wave duration in milliseconds [89 ± 20 in stroke group, 85 ± 18 in control group, (P>0.05)]. Stroke group included more patients with P wave duration >120ms [4 patients (8%)] than control group [2 patients (4%)] however this didn't reach statistical significance. There were highly significant statistical differences as regard P terminal force in V1 (PTFV1), [35 patients (70%) in stroke group had PTFV1 ≥40ms.mm, 5 patients (10%) in control group had PTFV1 ≥40ms.mm, (P<0.005)]. As regard the left ventricular hypertrophy in ECG, there was a highly significant statistical difference among the study groups [L.V.H in ECG was found in 14 patients (28%) in stroke group and in 6 patients (12%)in control group (p =0.009)]. *Table (13)*

In Table (14) , The left atrial diameter and left ventricular mass index are divided into four equal quartiles and the relation of abnormal PTFV1 to each of the four quartiles were studied. Our study found that there is significant increase in the incidence of abnormal PTFV1 among patients in higher quartiles left atrial echocardiographic diameters and LV mass index. *(Figure 33).*

Abnormal PTF was associated with ischemic stroke in both a univariate analysis (odds ratio [OR] 20.18; 95% CI 6.9-63.4), and a multivariate analysis adjusting for common stroke risk factors (OR 17.3; 95% CI 4.8 -83.5). Such a strong association remained significant after further adjusting for echocardiographically measured LA size (OR 16.8; 95% CI 3.3 -86.5). *Table (15):*

The sensitivity and specificity of abnormal P wave duration (≥ 120ms) to predict ischemic stroke were 8% and 96% with positive and negative predictive values of 66.67 % and 51 % respectively and 52% overall accuracy. The sensitivity and specificity of abnormal PTFV1 to predict ischemic stroke were 70% and 90% with positive and negative predictive values of 87.5% and 75 % respectively and 80% overall accuracy. The sensitivity and specificity of the Left atrial enlargement detected by echocardiography to predict ischemic stroke in our study were 46% and 64% with positive and negative predictive values of 56.1% and 54.2 % respectively and 55% overall accuracy. The sensitivity and specificity of the left ventricular hypertrophy detected by resting 12 lead ECG according to Cornell criteria to predict ischemic stroke were 28% and 88% with positive and negative predictive values of 70% and 55 % respectively and 58% overall accuracy. *Table (16) and Figure (34)*

Only age and P-wave duration doesn't have any significant correlations with LA diameter & LV mass index, and all other variables (IVSd, PWTd, LVIDd, LVIDs, EF, and abnormal p terminal force in lead V1) have strong significant correlations with both measures. *Table (17).*