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Relation between left atrial measurements and thromboembolic risk markers assessed by echocardiography in patients with non valvular atrial fibrillation: A cross-sectional study

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Background: Left atrium (LA) dilatation has been associated with adverse cardiovascular outcomes in patients with sinus rhythm and atrial fibrillation (AF).

Aim: We aimed to evaluate the accuracy of LA size to predict transesophageal echocardiographic (TEE) markers of increased thromboembolic risk (left atrial appendage (LAA) thrombus, low LAA velocities and dense spontaneous echocardiographic contrast (SEC), and also to assess the best method to evaluate LA size.

Patients & Methods: Cross sectional study included 64 patients with non valvular AF undergoing transthoracic and transesophageal echocardiographic (TTE and TEE) evaluation. LA size was measured on TTE by several methods including: anteroposterior diameter (AP), LA area in four and two apical chamber views and volumes by ellipsoid, single plane (1P) and biplane area-length (2P) formulas. All these measures were indexed to the body surface area (BSA). Thromboembolic markers including LAA thrombus, low LAA velocities, dense SEC and LA abnormality (LA ABN) which means presence of one or more of the previous three parameters were evaluated by TEE.

Results: There was statistically significant increase in indexed and non-indexed LA parameters in patients with LA ABN compared to patients without LA ABN. According to ROC curve, the study found that all indexed LA parameters were predictive for LAA thrombus with the highest AUC was indexed LA 1P area length volume (AUC 0.91, CI 95% 0.81-1.01, P<0.000), for LAA low flow velocity were indexed and non-indexed LA AP diameter with the highest AUC was indexed LA AP diameter (AUC 0.89, CI 95% 0.80-0.98, P<0.000), for LA dense SEC were indexed LA ellipsoid volume (AUC 0.78, CI 95% 0.66-0.96, P=0.002) and indexed LA 1P area length volume (AUC 0.78, CI 95% 0.66-0.90, P=0.002) and for LA ABN were all LA parameters with the highest AUC was indexed LA 1P area length volume (AUC 0.87, CI 95% 0.79-0.96, P<0.000). On multivariate logistic regression analysis of TEE parameters , the study found that the most predictive LA measurement for LAA thrombus was indexed LA AP diameter with cutoff 3 cm/m^2 (OR 7.5, 95% CI 1.24-45.2, P=0.02) for LAA low flow velocity was LA AP diameter with cutoff 6 cm (OR 17.6, 95% CI 3.23-95.84, P=0.001), for LA dense SEC was indexed LA ellipsoid volume with cutoff 42 cm^3/m^2 (OR 6.5, 95% CI 1.32-32.07, P=0.02), and for LA ABN was indexed LA ellipsoid volume with cutoff 42 cm^3/m^2 (OR 10.45, 95% CI 2.18-51.9, P=0.008).

Conclusion: LA enlargement is suitable to predict thromboembolic markers in patients with non-valvular AF. The indexed and non-indexed LA AP diameter and indexed LA ellipsoid volume were the most accurate parameters for predicting thromboembolic markers.

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