



Non Invasive Imaging (Echocardiography, Nuclear, PET, MR and CT)

ASSESSMENT OF LEFT ATRIAL VOLUMES BY 3D CT ANGIOGRAPHY AND 2D ECHOCARDIOGRAPHY IN PATIENTS UNDERGOING ATRIAL FIBRILLATION ABLATION

Poster Contributions

Poster Hall B1

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Session Title: Non Invasive Imaging: CT/Multimodality, Angiography, and Non-CT Angiography

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Background: In patients with atrial fibrillation (AF), left atrial size is associated with ablation outcomes and recurrence of AF. CT angiograms (CTA) are routinely performed for pulmonary vein mapping prior to ablation. We measured 3D left atrial volume (LAV) using a simple semi-automated CTA method in patients with AF and compared to the standard transthoracic echocardiographic (TTE) LA indices.

Methods: In 106 consecutive patients (mean age = 59 ± 10 , BSA = 2.1 ± 0.3 , 82 in AF and 24 in sinus rhythm) undergoing ablation for AF, CTA LAV was calculated using a semi automatic threshold based 3D model (Vitrea v 6.6.2; organ tool) and the area length method (ALM). CT LAV measures were compared to standard TTE (performed within 24hrs of CTA) measures.

Results: Mean 3DLAV- CT was 143 ± 43 ml; CT LAV(ALM) by CT 110 ± 37 ml; TTE LAV (ALM) 83 ± 27 ml. The inter (7 pts) and intra-observer (10 pts) reliability of 3DLAV-CT was high (96%; 98%). There was modest but significant correlation between 3DLAV-CT and TTE LAV (ALM) ($r=0.54$; $p < 0.0001$) while - CT LAV by ALM and 3D methods correlated well ($r=0.9$, $p < 0.0001$). There was consistent under estimation of 32.8 ml by CT ALM vs 3DLAV- CT. After correcting for this shift, the two CT methods had good agreement (intra class correlation coefficient (ICC) = 0.85). There was significant but inconsistent underestimation of LAV by TTE ALM (-59 ± 36 ml) vs 3DLAV-CT. By multivariate stepwise regression analysis were linear dimensions in the supero-inferior (mean 5.7 ± 0.9 cm; $r = 0.6$, $p < 0.0001$) and antero-lateral axis (mean 4.4 ± 0.7 cm; $r = 0.6$, $p < 0.0001$) predicted 3DLAV- CT better than planimetered 4 chamber area (25 ± 22 sqcm; $r = 0.4$, $p < 0.0001$) or LAV (ALM) ($r = 0.4$, $p < 0.0001$).

Conclusion: LAV estimation by 3D CTA is a simple and reproducible. CT LAV-ALM consistently underestimates 3DLAV- CT probably due to erroneous shape assumptions. Standard TTE measures of LA size are dependent on image quality and can be variable. There was modest correlation between standard TTE indices and 3D LAV- CT. LAV is underestimated by TTE vs CT methods probably due to limited visualization of LA contours and method differences. Linear measurements by TTE are better predictors of 3DLAV-CT than TTE area or volume measurements.