

**Role Of Transesophageal Echocardiography In
Diagnosis Of Acute Cardioembolic Cerebral Stroke
Patients With Normal Sinus Rhythm**

Thesis

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Summary

About 30-40% of ischemic stroke is of unknown cause. Recently, biomarkers of atrial dysfunction, or “atrial cardiopathy”, have been associated with embolic stroke risk even in the absence of atrial fibrillation (AF), suggesting that the presence of AF is not required for left atrial thromboembolism to occur. Most left atrial thrombi occur in the left atrial appendage (LAA) (**Kamel H, et al 2015**).

TEE has made accurate assessment and imaging of the LAA possible, allowing the evaluation of LAA morphology and flow patterns within it. TEE is currently the most widely used and accepted modality to diagnose and exclude the presence of LAA thrombi. The sensitivity and specificity of TEE for detection of LAA thrombi when compared with intraoperative observations are 92% and 98%, respectively , with negative and positive predictive values of 100% and 86%, respectively (**Beigel, et al 2014**).

This study aimed to present the role of Transesophageal echocardiography in cardiac evaluation in patients with ischemic stroke and its importance in detecting possible risk factors for cardio embolic stroke in those patients which cannot be detected by trans thoracic echocardiography.

This study was carried out in Fayoum University Hospitals, it included 120 patients; divided into 3 groups matched in age and sex each group included 40 patients.

Group A.; patients had stroke with normal sinus rhythm

Group B.; patients had stroke with atrial fibrillation

Group C.; patients with normal sinus rhythm and without stroke who were admitted and subjected to TEE for investigation for other possible diagnosis (e.g. infective endocarditis, masses and aortic dissection) with no abnormality detected.

The study participants were evaluated by full medical history, detailed physical examination, the following investigations were done;

- Standard 12-leads electrocardiogram.
- Computed tomography ,Magnetic Resonant Imaging of brain for patients with stroke.
- Bilateral carotid and vertebrbasilar arterial duplex for patients with stroke.
- Laboratory tests; (CBC,LDL HDL, serum total cholesterol ,serum triglycerides, kidney functions, liver functions ,coagulation profile, Electrolytes)
- Transthoracic echocardiography (TTE); All patients were subjected to complete TTE study . The following views were obtained; parasternal long and short axes, apical 4, 5, 3 and 2 chambers, and all valves were assessed for regurgitation or stenosis. Also the following parameters were obtained; LVED, EF, Mitral valve area, Left atrial diameter, PASP ,RWMA if present.
- Transesophageal echocardiography(TEE) ; Standardized TEE images were obtained with midesophageal 4-chamber, mitral commissural, 2-chamber, long axis, ascending aorta long axis, aortic valve short axis, right ventricular

inflow-outflow, and bicaval views. If no interatrial shunt was visualized with color flow Doppler in the bicaval view, agitated intravenous saline was administered for further evaluation. Additional standard images were obtained of the descending aorta and aortic arch in the short and long axis.

Detailed multiplanar evaluation of the LAA was performed and the following parameters were obtained, orifice diameter, depth, pulsed wave velocity, tissue Doppler upward and downward motion velocities of medial and lateral walls.

Our study concluded that, patients of Group B had the highest mean orifice diameter of LAA (1.72 ± 0.32 cm); followed by group A (1.56 ± 0.34 cm); and finally group C (1.30 ± 0.29 cm). We also found that group B had the lowest mean LAA pulsed wave emptying and filling velocities; followed by group A and lastly group C. The mean emptying velocity in m/s was [0.43 ± 0.16 VS 0.58 ± 0.23 VS 0.60 ± 0.20] and filling velocity was [0.32 ± 0.08 VS 0.53 ± 0.16 VS 0.56 ± 0.06] in groups B, A, and C respectively. Regarding LAA medial wall tissue Doppler upward and downward motion velocities, there was a significant difference between groups; it was lower in groups B&A than group C. The mean LAA medial wall tissue Doppler upward motion velocity was [0.13 ± 0.06 VS 0.14 ± 0.05 VS 0.26 ± 0.21] and the mean LAA medial wall tissue Doppler downward motion velocity was [0.13 ± 0.08 VS 0.14 ± 0.05 VS 0.19 ± 0.16] in groups B, A, and C respectively. There was insignificant difference between groups regarding LAA depth and LAA lateral wall tissue Doppler velocities. Prevalence of other abnormal TEE findings which constitute risk factors of stroke was higher in group B (30%) in form of LAA thrombus (10%), spontaneous echo contrast (20%) and lower in group A (12.5%) in form of patent foramen ovale (5%), atrial septal

defect (2.5 %), atherosclerotic aorta (2.5%) and vegetations on mitral valve (2.5%).Prevalence of DM ,hypertension and dyslipidemia were higher in patients with stroke (group B&A) than patients without (group C). Prevalence of recurrence of stroke was higher in group B (30%) than group A (15%) but statistically insignificant.

We recommend further studies including larger number of patients specifying those with cryptogenic stroke to identify the role of TEE in those patients. Also we recommend studying the role of TEE in patients with AF, to identify LAA parameters related to cardio embolization that may affect decision of anticoagulation regardless of their CHADS2.