

Left Atrial Appendage morphology and risk of clot formation. What is the mystery?

Abdul Wajid Khan Faisal*

Global Blockchain Consortium, Bengaged, Caspia Research In Web Limited, UK.

Corresponding Author : Abdul Wajid Khan Faisal – Global Blockchain Consortium, BEngaged, Caspia Research In Web Limited, UK.

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More than 90 % colts in LA are formed in left atrial appendage (LAA)¹ Why it is so? There must be something peculiar to LAA. Different shapes of LAA have varying risk of thrombus formation. Cauliflower shape has highest risk of thrombus formation ².

Faisal et al in The issue of journal of clinical and experimental cardiology (2017 volume 8 issue 9) discussed left atrial appendage morphology, does it matter? ³ 64 cases were studied. They highlighted another parameter of assessing the shape and its association with clot formation that is the depth to width ratio. So far the parameter has not been studied ever. Once the blood enters into LAA it has to come out of it, but in deeper LAA with narrow opening, in the presence of atrial fibrillation it is difficult for blood to come out of it. The blood stays there and clot is formed.

Left atrial appendage acts like a gutter in left atrium. Blood once enters into it, has to come out of it. If the LAA is deep with narrow opening into left atrium especially in the presence of atrial fibrillation the blood stays there and leads to clot formation. In contrast if LAA is shallow with wide opening into left atrium and the patient is in sinus rhythm, blood can easily come out of it and no clot is formed.

There are many factors which predispose to clot formation in LAA, including LAA outflow velocity, LAA shape and size. There are different etiologies of clot formation in LAA. One of them is LAA outflow velocity. The velocity of less than 20 cm/sec is strongly associated with clot formation.⁴ This also suggests that blood should flow at a good speed to come out of LAA. This parameter has not been studied by Faisal et al. But with deeper LAA, it is difficult for blood to maintain its velocity to prevent stasis.

Another study is required to assess the relation of depth of LAA to its outflow velocity. Somerville et al. have shown that LAA size is associated with

Increased risk of stroke⁵. However Di Biase et al. did not support this finding in his study ². Whereas Ernst and Veinot et al. favored the finding that association does exist between the LAA size and the risk for stroke/TIA, especially in patients with non valvular AF ^{16,7}.

In this study Patients with valvular AF are more prone to clot formation if they have deeper LAA. So this controversial issue remains to be solved.

Anticoagulation used for valvular or non valvular AF has its own morbidity and mortality.⁸ Left atrial appendage closure is advised for high-risk patients with non-valvular AF who have either contraindication for anticoagulation or are not suitable for long-term anticoagulant therapy, have increased bleeding risk, or they prefer an, alternative. There must be some guidelines to address the issue that which LAA must be closed and which LAA may be left alone safely.

This study provides an insight into it and we think patients with deep LAA and narrow opening into LA should be considered for anticoagulants or LAA closure

Due to small sample size the findings of this study cannot be generalized, however this study provides a food for thought. Dimensions measured are very sensitive, slight changes in angle or position of trans esophageal probe can lead to variable results

LA appendage closure by surgical or percutaneous technique must take into account the depth and width of LA appendage. Deeper LA appendages with narrow opening into LA must be closed but shallow LA appendages with wide opening into LA may be left alone

In Summary LAA is deep or shallow, it does not predispose to clot formation, when in sinus rhythm but if the patient is in atrial fibrillation the deeper LAA with narrow opening into LA has more chances of clot formation.

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