

Echocardiography in Left Atrial Thrombosis

Tara Moghaddasfar¹, Hamed Vahidi¹, Maryam Faramarzpour¹, and Farnoosh Larti¹

¹Tehran University of Medical Sciences

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Abstract

Atrial fibrillation is associated with low-flow state and increased thrombogenicity in the left atrium (LA). Multiple echocardiographic presentations, including thrombosis, sludge, and smoke formation, have been demonstrated in just one biplane transesophageal echocardiographic view, along with normal structures, i.e., pectinate muscles and Coumadin ridge, which are highly educational for cardiologists.

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Tara Moghaddasfar¹, Hamed Vahidi¹, Maryam Faramarzpour¹, Farnoosh Larti^{1*}

1-Department of Cardiology, Imam Khomeini Hospital Complex, Tehran University of Medical Sciences, Tehran, Iran

*Name and a complete address for correspondence:

Farnoosh Larti, Email: Farnooshlarti@gmail.com, Postal code: 1419733141, Cardiology Department, Imam Khomeini Hospital Complex, Keshavarz Boulevard, Tehran, Iran, telephone number: +989188319061, +9861192647.

ORCID ID:0000-0001-7939-9306

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Abstract

Atrial fibrillation is associated with low-flow state and increased thrombogenicity in the left atrium (LA). Multiple echocardiographic presentations, including thrombosis, sludge, and smoke formation, have been demonstrated in just one *biplane* transesophageal echocardiographic view, along with normal structures, i.e., pectinate muscles and Coumadin ridge, which are highly educational for cardiologists.

Case Presentation

A 54-year-old man with a history of mitral valve repair nine years ago due to a flail posterior mitral valve leaflet was admitted to our hospital. He also had a history of permanent atrial fibrillation (AF) and was taking warfarin, but his International Normalized Ratio (INR) was subtherapeutic. Transesophageal echocardiography (TEE) for assessment of LA thrombosis was performed. Interestingly, different echocardiographic

presentations of the increased thrombogenicity in the left atrium (LA) have been detected in just one biplane view (Figure 1, Video S1). A large LA thrombosis, LA appendage sludge, severe spontaneous echo contrast (smoke) in the LA, and normal structures, such as pectinate muscles and Coumadin ridge, were detected.

Spontaneous echo contrast (SEC) or smoke is defined as an echogenic, dynamic, swirling blood flow pattern mainly observed as a marker of a low-flow state in the LA. The presence and the grade of SEC are related to an increased risk of thrombosis formation in the LA. The severity is graded from 0 to 4+, with grade 0 indicating the absence of echogenicity and grade 4+ indicating severe echogenicity and very slow swirling patterns in the LAA, usually with similar density in the LA cavity (1).

Among patients with AF, the prevalence of spontaneous echo contrast in LA was 8 percent, and the rate of sludge was 1-3.4 percent based on different studies. Between 2 to 12.4 percent of patients with AF taking vitamin k antagonists (VKA) may have LA or LAA thrombosis depending on the study population (2).

Pectinate muscles are normal ridge-like structures within the LAA wall that may be difficult to distinguish from LAA thrombosis, specifically at the tip of the LAA. Coumadin ridge is a band-like structure between LAA and the left upper pulmonary vein that may cause a reverberation artifact resembling a thrombosis in the LAA (3).

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Figure Legend

Biplane view in transesophageal echocardiography demonstrating left atrial thrombosis, left atrial smoke, left atrial appendage sludge, pectinate muscle in the left atrial appendage, and Coumadin ridge.

Red arrow: Pectinate muscle

Yellow arrow: Left atrial appendage sludge

Red arrowhead: Left atrial smoke

Yellow arrowhead: Coumadin ridge

Red star: Left atrial thrombosis

