

Coumadin ridge: An echocardiographic trap

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A 63-year-old male, with no history of chronic conditions, was admitted to the Department of Cardiology for myocardial infarction. The patient reported chest discomfort. Physical examination revealed no significant abnormalities; the heart rate was regular at 62/min and blood pressure was 154/95 mm Hg. Electrocardiography showed anterior and inferior wall ischemia. We performed invasive coronary angiography and primary percutaneous coronary intervention on the left anterior descending artery followed by staged percutaneous coronary intervention on the circumflex artery on the next day. Laboratory test results showed elevated troponin T levels. Bedside echocardiography revealed segmental myocardial systolic dysfunction with reduced ejection fraction (Biplane Simpson method 35%), with no significant valvular disease. There was a longitudinal structure within the left atrium (Figure 1A). Echocardiography was then repeated in the echocardiography laboratory and showed the presence of an additional structure located at the lateral wall of the left atrium, adjacent to the left atrial appendage (LAA) and the left superior pulmonary vein. The motion of this structure was consistent with the cardiac cycle, and its echogenicity was comparable to that of heart tissues (Figure 1B and 1C). This finding prompted a tentative diagnosis of a prominent coumadin ridge. Transesophageal echocardiography (TEE) showed a structure, which resembled a cotton swab, with a narrow proximal part and a bulbous distal part (Figure 1D). Cardiac magnetic resonance imaging (cMRI) showed a structure in a four-chamber view, which was not visible in any other sequences and showed no contrast enhancement (Figure 1E). This structure

was then assumed to be a prominent coumadin ridge; therefore, no further investigations were performed, nor was any anticoagulant treatment initiated.

A coumadin ridge is an anatomic variant, which is an embryological remnant, detected in the left atrium between the left superior pulmonary vein and the LAA. Being aware of the existence of this structure may be crucial for differential diagnosis of any focal lesions found in the left atrium and planning of percutaneous transcatheter interventions, such as ablation or LAA closure. Coumadin ridges show inter-individual variability, and their estimated prevalence is 60% on gross postmortem examinations [1]. The ridge tissue fold contains the ligament of Marshall, an autonomic nerve bundle and a small atrial or sinoatrial-node artery. The vestigial ridge is usually invisible on echocardiography; however, if prominent, the structure may be misdiagnosed [2]. On TEE, its shape resembles that of a cotton swab (“Q-tip sign”) [3]. Computed tomography or cMRI can be useful in differential diagnosis [4].

Utmost caution should be exercised every time a coumadin ridge-like focal lesion in the left atrium is diagnosed since myxomas, fibromas, and thrombi may be also found in the same location [5]. On TEE, a coumadin ridge interferes with good imaging of the LAA, which should be imaged omitting the structure, preferably “above” the entrance to the LAA, moving the structure to the side. Coumadin ridges may also impede the flow of blood in the LAA and may be associated with thromboembolic complications, which requires further study. Imaging study results should be interpreted in the clinical context, with the thromboembolic risk and possible

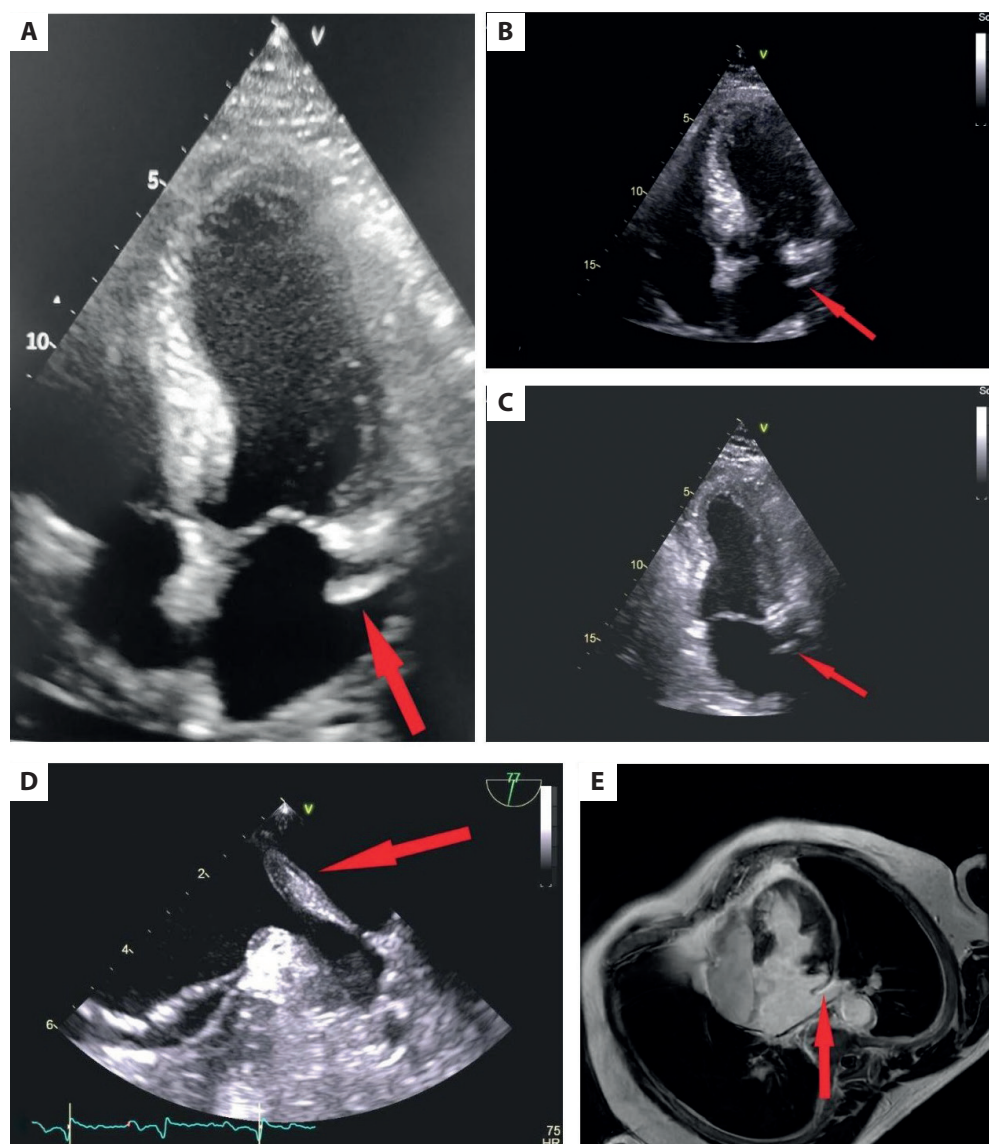


Figure 1. **A.** A focal lesion in the left atrium measuring 19×5 mm (apical four-chamber view) first noticed on bedside transthoracic echocardiography in a cardiac intensive care unit patient (red arrow). **B.** The coumadin ridge-like focal lesion in the left atrium (apical four-chamber view) visualized on repeat transthoracic echocardiography performed in the local echocardiography laboratory (red arrow). **C.** The coumadin ridge-like focal lesion in the left atrium (two-chamber view) visualized on repeat transthoracic echocardiography performed in the local echocardiography laboratory (red arrow). **D.** The location and structure of the coumadin ridge-like lesion measuring approximately 28 mm on transesophageal echocardiography (modified bi-commissural view) (red arrow). **E.** The coumadin ridge-like lesion in the left atrium on cardiac magnetic resonance imaging (red arrow)

cancer history taken into consideration. In the presented case, TEE and cMRI were used to determine the nature of the lesion.

Being aware of the presence of anatomic variants within the left atrium, along with their structure and location, is indispensable to avoid initiating unnecessary therapeutic interventions and expanding the scope of diagnostic investigations.

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