

# Coronary artery microfistulae, Thebesian veins, or vessels of Wearn?

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## Abstract

We present the case of a 73-year-old woman with coronary artery-left ventricular multiple microfistulae, who was admitted with symptoms and ECG suggestive of coronary artery disease. Coronary angiography revealed tortuous coronary arteries with multiple microfistulae between the left coronary artery and the left ventricle, as well as between the right coronary artery and the left ventricle. Transthoracic echocardiography (TTE) was also able to clearly demonstrate the presence of the microfistulae with their direction of blood flow towards the left ventricle. Despite traditional reliance on coronary angiography, this case advocates for the diagnostic role of TTE due to its non-invasive nature and ability to provide crucial preliminary information, even in cases with such small structures as these microfistulae. We emphasize the importance of precise, modern terminology over historical eponyms such as Thebesian veins or vessels of Wearn, aligning medical communication with contemporary diagnostic capabilities.

**Keywords:** coronary fistulae; Thebesian veins; vessels of Wearn

## Introduction

Coronary artery anomalies include a diverse range of conditions with varying clinical significance, among which coronary artery fistulae (CAFs) stand out due to their rarity and potential impact on cardiac function and patient wellbeing. CAFs are abnormal connections between coronary arteries and cardiac chambers or vessels, which can alter hemodynamics and myocardial perfusion, leading to a spectrum of clinical manifestations. The diagnosis and understanding of these anomalies have significantly evolved with the advent of advanced imaging techniques, offering precise visualization and assessment of these structures.

In the realm of medical terminology, especially regarding anatomical eponyms, there exists a compelling discussion on accuracy and historical integrity. Traditionally, terms such as “Thebesian veins” or “vessels of Wearn” have been used to describe certain coronary microvascular structures [1, 2]. However, these eponyms may obscure the true nature of the entities they denote, especially considering that the anatomists and physicians they are named after did not have access to the diagnostic modalities that define our current understanding of these structures [3, 4]. For instance, neither Adam Christian Thebesius nor Joseph Wearn, despite their significant contributions to our understanding of cardiac anatomy and physiology, had the means to employ coronary angiography or color Doppler ultrasound—techniques that are now pivotal in diagnosing coronary artery microfistulae.

Given this context, employing terminology that accurately reflects our current diagnostic capabilities and understanding of these structures becomes really crucial. Thus, it is our belief that the term “coronary artery microfistulae,” or more specifically, “coronary artery-left ventricular multiple microfistulae,” is a better alternative to historical eponyms. This terminology not only acknowledges the advancements in medical imaging but also ensures clarity in the characterization of these anomalies. Our case exemplifies the importance of precise diagnostic assessment in identifying multiple microfistulae between coronary arteries and the left ventricle, a condition that significantly deviates from the conventional presentations of CAFs and challenges our clinical management strategies.

## Case report

We present the case of a 73-year-old female patient who was admitted with complaints of chest discomfort and an ECG with evidence of diffuse ST-depressions and inverted T-waves in leads V3 through V6 (see Fig. 1). Laboratory tests did not reveal increased markers of myocardial necrosis. Given the complaints and recorded ECG changes, the patient was referred for invasive evaluation, which did not reveal obstructive coronary disease, but multiple microfistulae were visualized between the left coronary artery (LCA) and left ventricle (LV), as well as between the right

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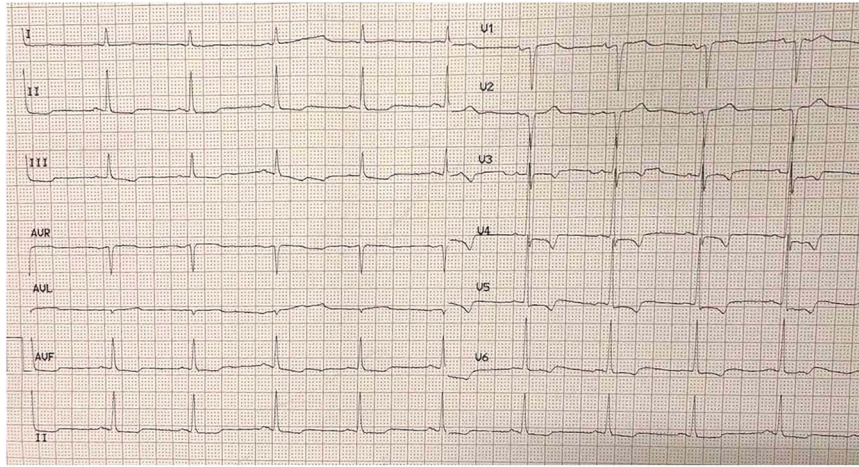


Figure 1. ECG at admission.

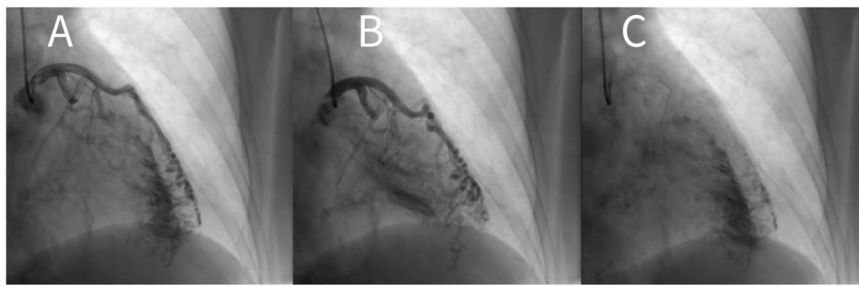


Figure 2. Right anterior oblique (RAO) cranial view of the LCA in three different phases. In A, contrast is seen within the LCA and the myocardium. In B, contrast is seen within the LCA and the left ventricle. In C, contrast has washed off from the LCA and is seen passing from the myocardium towards the left ventricular cavity.

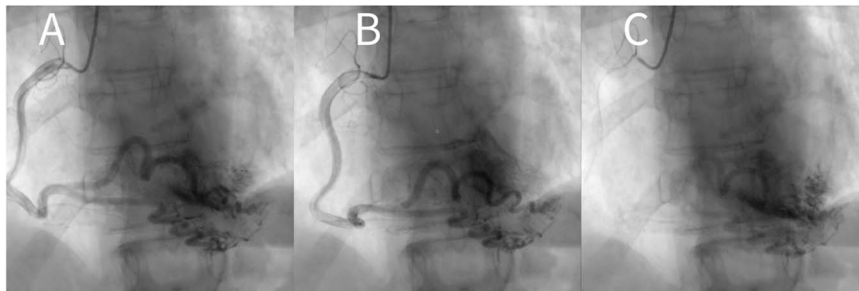


Figure 3. Left anterior oblique (LAO) cranial view of the RCA in three different phases. In A, contrast is seen within the RCA and the myocardium. In B, contrast is seen within the RCA and the left ventricle. In C, the contrast has washed off from the RCA and is seen passing from the myocardium towards the left ventricular cavity.

coronary artery (RCA) and left ventricle (see [Figs 2 and 3](#), as well as [Videos 1 and 2](#)). Transthoracic echocardiography (TTE) revealed preserved left ventricular systolic function, without significant valvular lesions and indirect evidence of increased pulmonary pressure. Moreover, intramyocardially numerous microfistulae were visualized with the direction of blood flow from the epicardium to the endocardium, which were most pronounced around the apex (see [Fig. 4](#) and [Video 3](#)). Diastolic dysfunction with a restrictive flow pattern and evidence of increased left ventricular filling pressures were also noted on echocardiography (see [Fig. 5](#)). Interestingly enough, pulse wave Doppler was able to record the flow through the microfistulae which was observed during ventricular diastole (see [Fig. 6](#) and [Video 4](#)). Conservative treatment with optimal drug therapy and regular follow-up, both clinically and echocardiographically, was recommended to the patient since the ideal therapy for such fistulae remains ambiguous and their closure is technically difficult to implement.

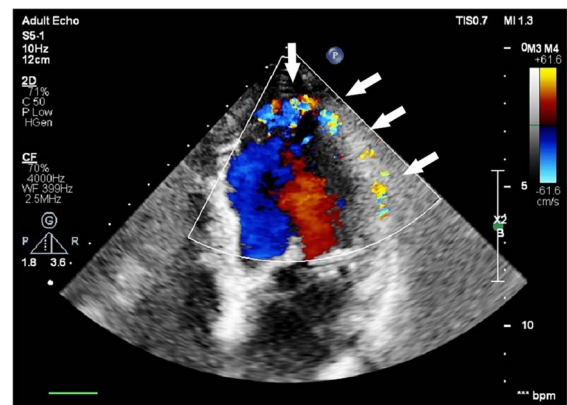


Figure 4. TTE color Doppler image showing turbulent blood flow within the left ventricular myocardium due to the presence of microfistulae.

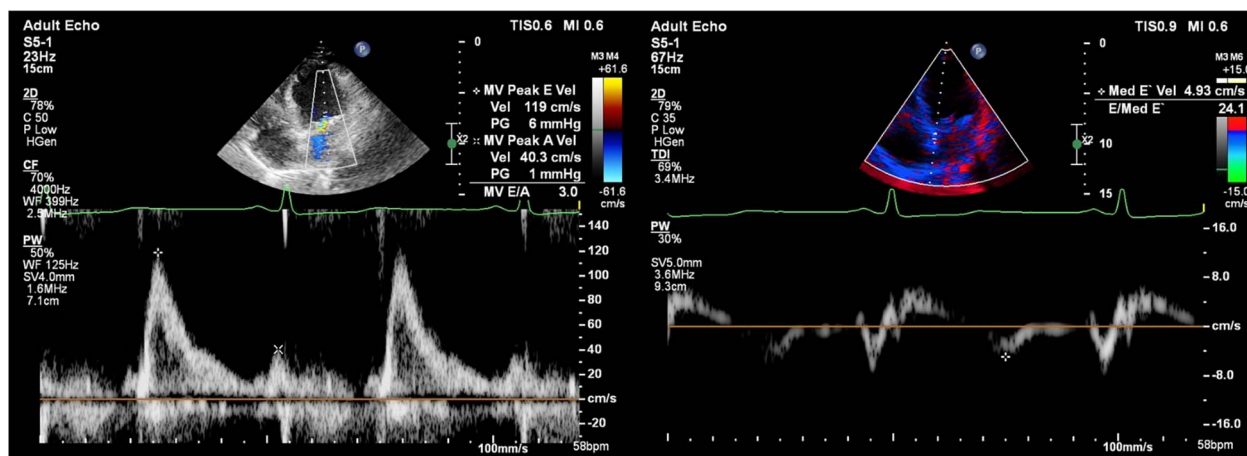


Figure 5. Pulse wave Doppler restrictive diastolic flow pattern is shown on the left side. On the right, tissue Doppler of the medial mitral annulus is visualized with evidence of elevated left ventricular filling pressures.

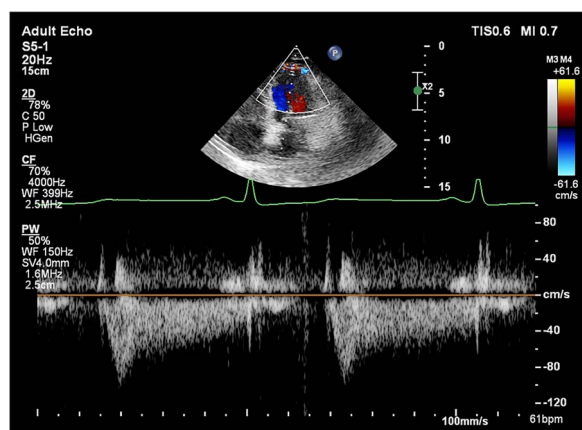


Figure 6. Pulse wave Doppler showing blood flow within the myocardium during ventricular diastole.

## Discussion

The presence of coronary artery microfistulae (CAMF) without obstructive coronary disease is a relatively rare clinical entity, with few cases reported in the medical literature [5–7]. These microfistulae can lead to various clinical manifestations ranging from asymptomatic presentations to angina, myocardial ischemia, or even heart failure, depending on their size, number, and the hemodynamic burden they impose. The findings of the case discussed here align with those from previous studies, where coronary microfistulae were incidentally discovered during assessment for myocardial ischemia, emphasizing the importance of considering CAMF in the differential diagnosis for similar clinical presentations, especially in women aged 60–80 years with normal troponin and negative T-waves on the precordial leads [6–9].

Despite selective coronary angiography being traditionally considered the gold standard for diagnosing microfistulae between the coronary arteries and the left ventricle [7], we believe that this assertion warrants a critical reevaluation. It is important to note that these fistulae are often incidental findings during angiography, not the primary objective of the procedure. Furthermore, the course of diagnostic investigation typically begins with less invasive methods before escalating to invasive techniques. In this context, color Doppler sonography within transthoracic echocardiography (TTE) emerges as a pivotal preliminary diagnostic tool. TTE offers a non-invasive, readily accessible, and cost-effective

method for the initial assessment of patients with suspected coronary artery anomalies. Its ability to visualize blood flow dynamics in real-time provides crucial information about the presence of abnormal connections between the coronary arteries and the left ventricle, potentially identifying both large and small fistulae before the patient undergoes more invasive investigations.

As far as the management strategies for CAMF are concerned, therapy can range from conservative monitoring to surgical or catheter-based interventions in symptomatic cases or those at risk of complications [7, 8]. Given the preserved left ventricular function and the absence of significant valvular lesions in our patient, a conservative approach with close monitoring, including regular TTE, was taken, keeping with recommendations from previous reports. However, the decision must be individualized for each patient, considering symptoms, risk of complications, and the hemodynamic impact of the microfistulae.

In conclusion, the presented case shows the pivotal role of transthoracic echocardiography (TTE), particularly color Doppler sonography, in the initial diagnostic pathway of coronary artery-left ventricular microfistulae. This non-invasive modality offers a critical first glance at potential coronary anomalies, challenging the traditional primacy of selective coronary angiography and advocating for a less invasive approach to diagnosis. Moreover, this case accentuates the necessity of adopting precise and modern terminology over historical eponyms, reflecting the advancements in diagnostic capabilities. By moving away from terms like “Thebesian veins” or “vessels of Wearn” towards more descriptive nomenclature, the medical community can ensure clarity, accuracy, and relevance in the diagnosis and discussion of CAMF. Furthermore, current guidelines lack specific recommendations for coronary artery anomalies, particularly coronary artery microfistulae, as potential causes of chronic coronary syndrome, and the treatment of these microfistulae remains ambiguous. Emphasis should be placed on addressing these gaps in future guidelines for managing patients with coronary artery disease.

## Supplementary data

Supplementary data is available at Oxford Medical Case Reports online.

## Conflict of interest

No conflicts of interest.

## Funding

None declared.

## Ethical approval

No ethical approval was required.

## Consent

Written consent was obtained from the patient and is available upon request.

## Guarantor

Dzhem Farandzha, corresponding author.

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