

# A Rare Case of Acute Limb Ischemia due to Left Ventricular Thrombus in Ischemic Heart Disease: Different Approaches to Long-Term Anticoagulant and Antiplatelet Therapy

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## SOUHRN

Trombus v levé komoře (left ventricular thrombus, LVT) se může vytvořit v důsledku progresu ischemické choroby srdeční (ICHS), která může ve vzácných případech migrovat do nějaké periferní tepny. V tomto článku popisujeme případ 58letého muže přijatého do naší nemocnice s náhlým nástupem bolesti a necitlivostí pravé dolní končetiny; byla stanovena diagnóza akutní ischemie dolní končetiny. Nečekaně se ukázalo, že muž trpí i němou a rozsáhlou ICHS vedoucí k srdečnímu selhání se sníženou ejekční frakcí (heart failure with reduced ejection fraction, HFrEF) a ke vzniku LVT. Jako příčina akutní ischemie dolní končetiny byla u tohoto pacienta stanovena periferní embolizace trombem. Ke snížení možnosti rozvoje kardiovaskulární příhody a progresu onemocnění bylo třeba zahájit účinnou antitrombotickou léčbu. Pacienti s akutní ischemií dolní končetiny a komplexní ICHS a LVT mohou vyžadovat kombinaci antikoagulační a antiagregační léčby. Proto je třeba zvolit individualizovaný přístup, který je založen na stanovení rizika ischemie a krvácení u pacienta s cílem více omezit možnost ischemických příhod a současně zabránit vzniku významných krvácivých příhod.

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## ABSTRACT

Left ventricular thrombus (LVT) may develop from the progression of coronary artery disease (CAD), which can rarely embolise and migrate to the peripheral artery. Here, we report the case of a 58-year-old man admitted to our hospital with a sudden onset of pain and numbness in his right lower limb, diagnosed as ALI. Unexpectedly, he also had silent and extensive CAD leading to heart failure with reduced ejection fraction (HFrEF) and LVT formation. LVT embolization in the peripheral artery was identified as the cause of ALI in this patient. Effective long-term antithrombotic therapy was necessary to reduce cardiovascular adverse events and disease progression. Patients with ALI coexisting with complex CAD and LVT may require a combination of anticoagulant and antiplatelet therapy. Therefore, an individualised approach is warranted. This approach is based on the evaluation of the ischemic and bleeding risks of the patient to achieve a greater reduction in ischemic events while avoiding significant bleeding events.

### Keywords:

Acute limb ischemia

Anticoagulant

Antiplatelet

Ischemic cardiomyopathy

Left ventricular thrombus

## Introduction

Left ventricular thrombus (LVT) is often associated with myocardial infarction (MI).<sup>1</sup> LVT can also lead to peripheral embolization causing limb ischaemia which is very rare.<sup>2</sup> Currently, LVT treatment remains debatable. The consideration of anticoagulant and antiplatelet combination therapy is often challenging in this complicated case.

## Case report

A 58-year-old man with a history of heavy smoking was admitted to our hospital because of 12 hours of right lower leg pain and numbness. There were no reports of chest pain, tightness, palpitations or history of leg pain were recorded. On physical examination, he had hypertension with an initial blood pressure of 144/92 mmHg.

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Fig. 1 – Clinical manifestation showed slightly mottled appearance and red discoloration of right lower extremity, highly concerning of acute limb ischemia.

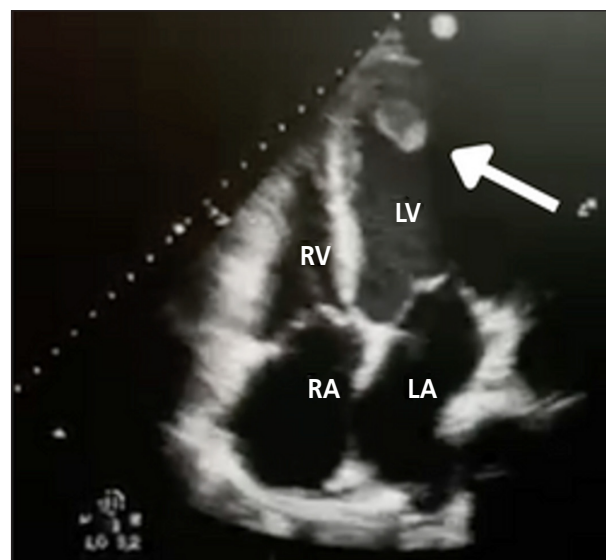


Fig. 4 – Transthoracic echocardiography (TTE) showed LV dilatation with severe systolic dysfunction markedly LV ejection fraction (EF) reduction of 28%. Abnormalities of regional wall motion were present with akinesis of anteroseptal wall and hypokinesis.

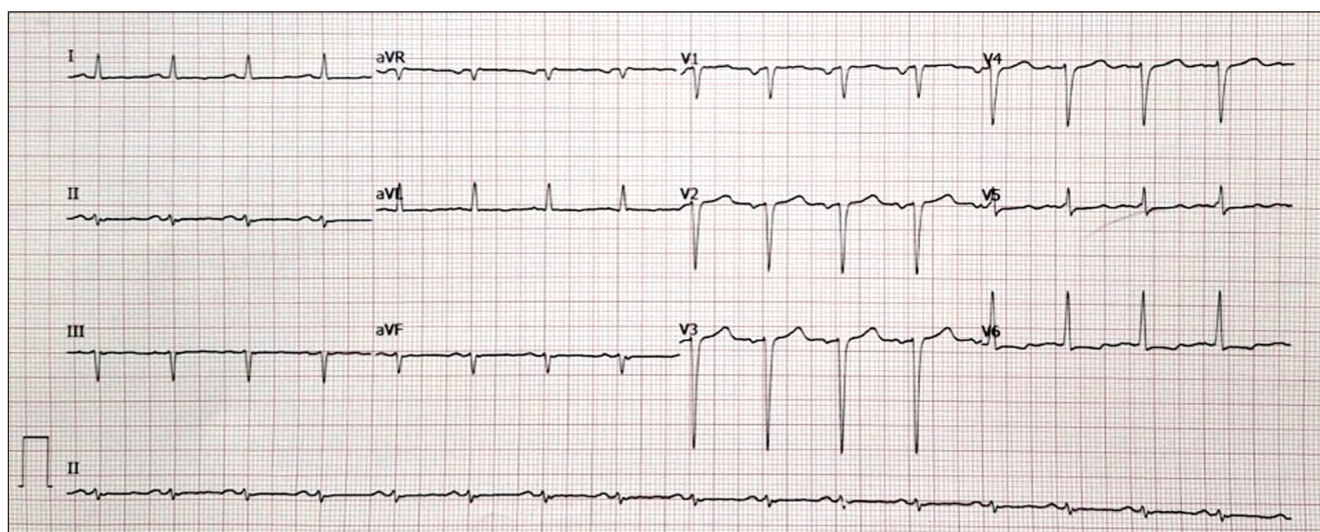


Fig. 2 – The electrocardiogram (ECG) showing a sinus rhythm, normal frontal axis, clockwise rotation, QS pattern in  $V_1$ - $V_3$ , poor R wave progression in  $V_1$ - $V_4$ .

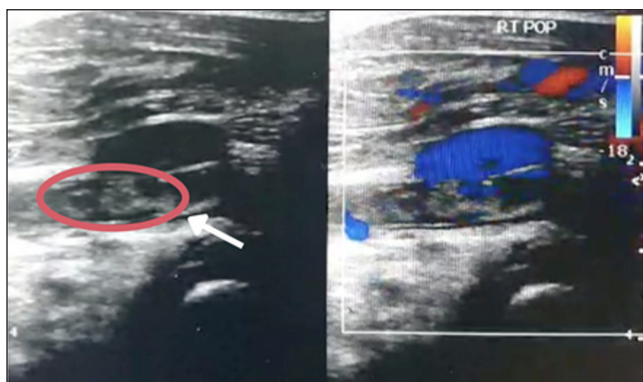


Fig. 3 – DUS showed a partially thrombosed popliteal artery in the right limb, which occluded 80–90% of the ostium, leading to difficulty in evaluating arterial flow towards the distal end.

The right limb assessment revealed cold and pale digits (Fig. 1). No pulse was palpated at the artery of the right popliteal, posterior tibial and dorsalis pedis of the right limb. Oxygen saturation was undetectable in all right toes. Electrocardiogram (ECG) showed findings of OMI anteroseptal whereas the presence of QS pattern in  $V_1$ - $V_3$  and poor R wave progression in  $V_1$ - $V_4$  (Fig. 2). Routine hematologic examinations were carried out, which revealed a platelet count of  $601 \times 10^9/L$ , an  $HbA_{1c}$  of 10.1%, and an albumin level of 3.21 g/L, while other routine blood profiles were within normal limits. Chest x-ray imaging showed cardiomegaly. Duplex ultrasonography (DUS) of the right limb showed subtotal-total occlusion of the thrombus in the popliteal artery (Fig. 3). Transthoracic echocardiography (TTE) showed LV dilatation, reduced systolic function with an ejection

fraction (EF) of 28%, anteroseptal-anterior akinesis, lateral-inferior hypokinesis. A 2.6 × 1.5 cm apical LVT was noted (Fig. 4). Unexpectedly, CT-coronary-angiography revealed an extensive coronary artery occlusion resulting in triple vessel coronary artery disease (CAD) (TVD) without any typical MI symptoms has been reported in this patient. The patient has been diagnosed with ALI classified to Rutherford as IIB, in concomitance with heart failure with reduced ejection fraction (HFrEF) with underlying CAD.

Intravenous heparin and analgesics were administered. An emergency thrombectomy was performed by the cardiothoracic surgeon. After the procedure, the clinician considered administering a combination of warfarin as an oral anticoagulant (OAC) and aspirin as single antiplatelet therapy (SAPT) for three months. Additionally, the patient was prescribed a beta-blocker, mineralocorticoid receptor antagonist (MRA), ACEI and high-intensity statin. In the future, this patient was scheduled to undergo coronary arteriography (CAG) to determine the need of revascularization. Additionally, the use of implantable cardioverter-defibrillators (ICD) was proposed as a means of preventing sudden cardiac death. One week after discharge, the patient assessment in the outpatient clinic showed a good clinical outcome without any bleeding events.

## Discussion

Atherosclerosis is a systemic disease that affects several vascular beds, such as coronary artery disease (CAD), cerebrovascular disease and peripheral artery disease (PAD). The possibility of previous MI should be addressed in CAD patients despite presenting with asymptomatic manifestation.<sup>3</sup> An asymptomatic MI may lead to a delay in diagnosis and worsening complications, such as LVT and HFrEF. The patient in this case presented with a history of MI and HFrEF. In this clinical context, we did not perform testing for acute coronary syndrome biomarkers, such as high-sensitivity cardiac troponin (hs-cTn), as there were no clinical findings and the ECG was suggestive of acute cardiac ischemia. The hs-cTn is a biomarker that is widely used in the diagnosis, risk stratification, and management of patients with suspected ACS. It indicates cardiomyocyte injury and is used as a marker of MI.<sup>4</sup>

LVT is defined by Virchow's triad mechanism due to left ventricular wall akinesia and dyskinesia resulting in blood stasis, endocardial injury, and hypercoagulable state.<sup>5</sup> LVT was detected in 15% of patients with ST-elevation MI and 25% of patients with anterior MI. TTE is used as the screening modality for LVT, with or without ultrasound enhancement [1]. A mobile, protruding and apical LVT is associated with a thrombo-embolic event which occurs in 10–15% of patients who are untreated with anticoagulants.<sup>6</sup> Rarely, the thrombus embolization is targeted to peripheral arteries, such as ALI.<sup>5</sup>

ALI is a critical vascular emergency presenting with a sudden decrease in limb perfusion due to arterial occlusion. ALI in this patient was believed to be caused by embolic rather than thrombotic as there were no pre-existing arterial occlusive symptoms. The classic manifestations of

ALI are classified into a mnemonic known as the "6 Ps": pain, pallor, pulselessness, poikilothermia, paraesthesia, and paralysis.<sup>7</sup> DUS is a primary modality for screening and diagnosing PAD and has detected arterial occlusions in this case.<sup>8</sup> The severity of ALI has been described by the Rutherford classification based on sensory and motor function in the affected limb. It has an important role in clinician decision-making and in predicting the future prognosis of ALI.<sup>9</sup> Despite good viability, the presence of neurological deficit in the right lower limb in this patient was indicated for urgent revascularization.<sup>8</sup>

Antiplatelet therapy is typically given in MI to prevent the activation and aggregation of platelet in coronary arteries.<sup>10</sup> Furthermore, the discovery of LVT as a complication of MI indicates a patient with a significantly increased ischemic risk. Distant MI followed by LVT should be treated by OAC for 3 to 6 months.<sup>1,10,11</sup> PAD with indication for OAC and high-risk ischemic may be considered for OAC and SAPT for beyond one month.<sup>11</sup> Our clinician decided to treat this patient with a combination of OAC and antiplatelet for three months. A cross-sectional study has reported no thromboembolic events in 35 patients with LVT post-MI treated with aspirin and warfarin as a prophylaxis.<sup>12</sup> Despite the efficacy in ischemic risk prevention, the combination of anti-thrombotic drugs may increase the major bleeding risk that may be life-threatening which the clinician should be aware of. Multiple strategies were needed to reduce the bleeding event in many clinical contexts.<sup>13</sup>

In patients with heart failure, sudden cardiac death often occurs immediately. The use of an ICD has been proposed for patients with a history of coronary artery disease and a low ejection fraction (EF) below 35%. The etiology of mortality in these patients can be attributed to various electrical disturbances, including ventricular arrhythmia, bradycardia, and asystole. However, some cases may be caused by acute vascular events.<sup>14</sup>

## Conclusion

Early recognition of MI is important in reducing complications such as LVT formation. Various manifestations of LVT require an individual approach to treatment. This approach is based on weighing the ischemic and bleeding risk of the patient to a greater reduction of the ischemic event without producing a significant bleeding event. A further clinical trial of an anticoagulant and antiplatelet combination is needed to manage thrombosis in various contexts.

## Conflict of interest

There is nothing to disclose.

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## References

- McCarthy CP, Vaduganathan M, McCarthy KJ, et al. Left Ventricular Thrombus After Acute Myocardial Infarction: Screening, Prevention, and Treatment. *JAMA Cardiol* 2018;3:642–649.



2. Agarwal KK, Douedi S, Alshami A, et al. Peripheral Embolization of Left Ventricular Thrombus Leading to Acute Bilateral Critical Limb Ischemia: A Rare Phenomenon. *Cardiol Res* 2020;11:134–137.
3. Khan IA, Karim HMR, Panda CK, et al. Atypical Presentations of Myocardial Infarction: A Systematic Review of Case Reports. *Cureus* 2023;15:e35492.
4. Byrne RA, Rossello X, Coughlan JJ, et al. 2023 ESC Guidelines for the management of acute coronary syndromes [published correction appears in *Eur Heart J* 2024;45:1145]. *Eur Heart J* 2023;44:3720–3826.
5. Delewi R, Zijlstra F, Piek JJ. Left ventricular thrombus formation after acute myocardial infarction. *Heart* 2012;98:1743–1749.
6. Stratton J R, Resnick A D. Increased embolic risk in patients with left ventricular thrombi ALI to Essential Thrombocytosis. *Circulation* 1987;75:1004–1011.
7. Callum K, Bradbury A. ABC of arterial and venous disease: Acute limb ischaemia. *BMJ* 2000;320:764–767.
8. Aboyans V, Ricco JB, Bartelink MEL, et al. 2017 ESC Guidelines on the Diagnosis and Treatment of Peripheral Arterial Diseases, in collaboration with the European Society for Vascular Surgery (ESVS). *Eur Heart J* 2018;39:763–816.
9. Rutherford RB, Baker JD, Ernst C, et al. Recommended standards for reports dealing with lower extremity ischemia: revised version. *J Vasc Surg* 1997;26:517–538.
10. Knuuti J, Wijns W, Saraste A, et al. 2019 ESC Guidelines for the diagnosis and management of chronic coronary syndromes [published correction appears in *Eur Heart J* 2020;41:4242]. *Eur Heart J* 2020;41:407–477.
11. Levine GN, McEvoy JW, Fang JC, et al. Management of Patients at Risk for and With Left Ventricular Thrombus: A Scientific Statement From the American Heart Association. *Circulation* 2022;146:e205–e223.
12. Ebrahimi M, Fazlinezhad A, Alvandi-Azari M, Abdar Esfahani M. Long-term clinical outcomes of the left ventricular thrombus in patients with ST elevation anterior myocardial infarction. *ARYA Atheroscler* 2015;11:1–4.
13. Barnes GD. Combining antiplatelet and anticoagulant therapy in cardiovascular disease. *Hematology Am Soc Hematol Educ Program* 2020;2020:642–648.
14. McDonagh TA, Metra M, Adamo M, et al. 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. *Eur Heart J* 2021;42:3599–3726.

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