Heart Sci J 2024; 5(3): 71-75

Contents list available at www.heartscience.ub.ac.id

Heart Science Journal

Journal Homepage : www.heartscience.ub.ac.id

Case Report

The Consequences of a Heart Condition: Acute Stroke and Limb Ischemia Secondary to Massive Intracardiac Thrombus in a Young Female with Dilated Cardiomyopathy

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ARTICLE INFO

Keyword :
Acute Stroke;
Dilated Cardiomyopathy;
Limb Ischemia;
Massive Intracardiac Thrombus.

ABSTRACT

Background: Dilated cardiomyopathy (DCM) is associated with the increased occurrence of left ventricular (LV) thrombosis caused by cardiac dysfunction. This condition is associated with significant mortality and morbidity because of its significance as a potential source of systemic emboli. We are reporting a case of Acute Stroke and Limb Ischemia in a Young Female Patient with DCM.
Case Illustration: A 20-year-old female was referred to our hospital due to pain in her right lower extremities and weakness in her right limb. She had been diagnosed with peripartum cardiomyopathy five years earlier. A general physical examination found her right lower limbs to be cold and pulseless. A neurological examination revealed hemiparesis involving the right side of her body. The chest radiograph showed cardiomegaly. Electrocardiography indicated sinus rhythm with LVH. The transthoracic echocardiograms revealed significant LV systolic failure with a massive thrombus at LV. The Duplex ultrasound showed a thrombus at the right dorsal pedis artery, and a head CT scan revealed an acute infarct. The patient was started on heparin and bridged with warfarin 5mg orally daily, and she was uneventfully discharged after one week.
Conclusion: DCM had been associated with thrombosis, stroke, and an increased risk of thromboembolism. Previous studies had documented decreased thromboembolic events due to administering anticoagulants.

1. Introduction

Dilated cardiomyopathy (DCM) is a type of myocardial disease that can be identified by the thinning and stretching of the cardiac chambers. Cardiac dysfunction is a defining feature of this condition, which gives rise to a range of complications, including the formation of intracardiac thrombi. They have the potential to detach and embolize to distant anatomical locations, hence giving rise to severe consequences such as cerebrovascular events and peripheral limb ischemia[1].

The study published in Heart Failure Reviews focuses light on the worldwide consequences of DCM, a medical condition that poses substantial medical challenges and contributes to significant rates of mortality and morbidity. The study indicates that the global prevalence of DCM is 60 million individuals. DCM is a rare illness, with an annual incidence rate of 0.47–0.58 cases per 100,000 individuals and a prevalence of 1 to 4 cases per 100,000 individuals[1].

In the case, the thrombus has grown to a massive size, obstructing blood flow to the limbs and brain. Severe complications result from a massive intracardiac thrombus in a young female with DCM, emphasizing the critical importance of early detection and intervention in heart conditions to mitigate life-threatening consequences. The study underscores the need for vigilant monitoring and timely management to prevent catastrophic events such as stroke and limb ischemia in patients with dilated cardiomyopathy[2].

2. Case Presentation

A 20-year-old female patient was referred to our hospital because she had been experiencing pain in the right lower extremities and weakness in the right limb. The patient had received a diagnosis of postpartum cardiac myocardial infarction (PPCM) five years ago; however, she had not consistently adhered to medication management and monitoring. The patient experienced sudden weakness in her hands and feet upon waking up seven days before admission. However, she was not promptly sent to the hospital. There was no family history of cardiac disease.

On arrival, the patient showed a GCS of 15 and stable hemodynamics. On examination, her right lower limbs were cold and pulseless, but there was no paresthesia. The neurological examination showed hemiparesis on the right side. The chest radiograph showed cardiomegaly with a Cardiac Thorax Rasio (CTR) of 0.65 (Figure 1). The ECG showed a sinus rhythm with LVH (Figure 2). Her laboratory findings showed all hematological data, including a hemoglobin level of 12.5 g/dL, INR of 1.22, aPTT of 27.1 seconds, low levels of IgG and IgM anticardiolipin antibodies, and an ANA test result of 0.7.

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https://doi.org/10.21776/ub/hsj.2024.005.03.13
Received 8 November 2023; Received in revised form 1 April 2024; Accepted 30 April 2024.
Available online 25 July 2024

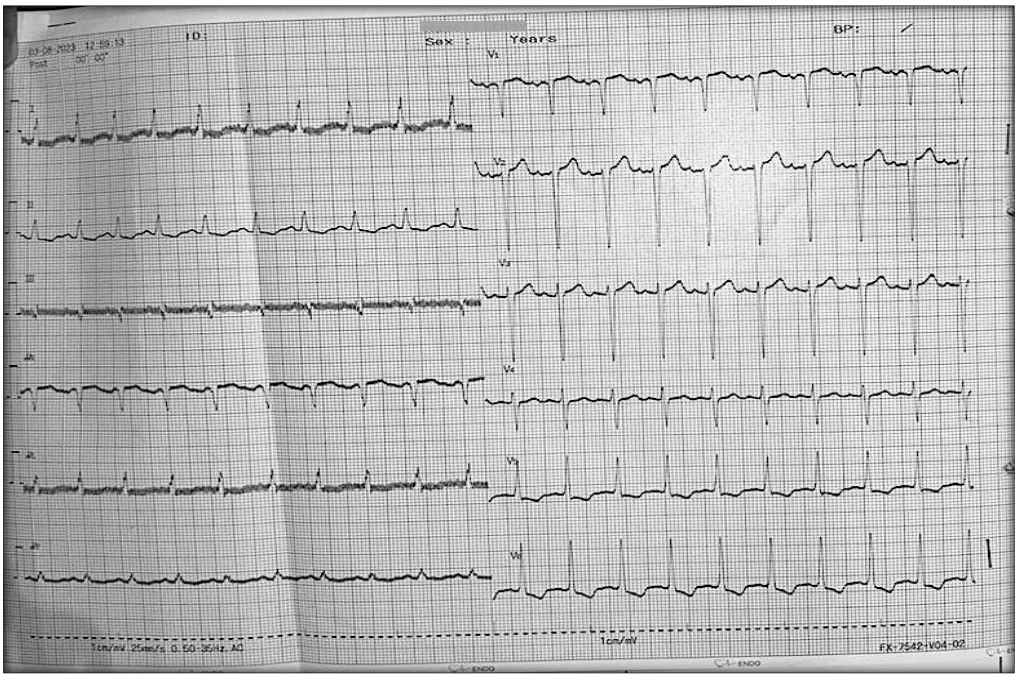

Figure 1. Electrocardiography Sinus Tachycardia HR 116 bpm, FA N, HA CWR, P wave N, PR int 160 msec, QRS duration 100 msec, Qtc 445 msec, ST-T chnages (-), poor r wave progression, LVH (cornel criteria)

Figure 2. Chest X ray showed Cardiomegaly with Left Ventricular Hypertrophy Configuration

The Transthoracic Echocardiogram (TTE) showed significant LV systolic function was impaired as shown by a LVEF of 23%, dilatation of LV, and an ovoid-shaped hyperechoic mass-like lesion identified at LV indicative of a mobile thrombus and massive thrombus (Figure 3). A mass-like lesion was suggested to indicate the presence of a thrombus in the context of significant left ventricular systolic failure. However, the possibility of a cardiac tumor could not be excluded. The DUS showed a thrombus within the right dorsal pedis artery.

The head CT scan indicated acute infarct in the left internal and external capsules, left corona radiata (Figure 4 A, B). Heparin administration was initiated, and the dosage was adjusted over five days. Following a period of five-day heparinization, the patient reported improved leg pain. However, a DUS scan showed the persistence of a thrombus at the site of the right dorsal pedis artery. The patient was discharged from the hospital and prescribed an angiotensin-converting enzyme (ACE) inhibitor, beta-blocker, mineralocorticoid receptor antagonist (MRA), and oral warfarin. Due to a nassive thrombi, there was an increased risk of further embolization. Consequently, surgical excision was advised, but the patient refused surgical excision. Then she routinely controlled and consumed medical treatment.

3. Discussion

DCM is characterized by the occurrence of LV dilation and extensive or localized systolic dysfunction that cannot be mainly caused by abnormal loading conditions such as hypertension, valve disease, coronary artery disease (CAD). According to contemporary epidemiological data, the prevalence of primary cardiomyopathies varies between 0.036 and 0.400% [3].

PPCM is an uncommon manifestation of cardiac dysfunction, characterized by the onset of heart failure in the postpartum period. Genetic investigations conducted on individuals diagnosed with PPCM showed a genetic resemblance between PPCM and DCM. In particular, there is a higher occurrence of truncating variants in TTN, FLNC, BAG3, and DSP, with TTN truncating variants being the most frequently observed (found in approximately 10% of patients). It has been suggested that approaches to genetic testing in PPCM should mirror those taken in DCM [3].

Previous research studies have indicated that the occurrence of left ventricular thrombus with DCM might range between 2% and 36% [5]. A commonly accepted paradigm (based on Virchow's triad of thrombogenesis) posits the pathogenesis of LV thrombus as occurring as a result of the interplay of 3 factors: (1) stasis attributable to reduced ventricular function, (2) endocardial injury, and (3) inflammation/hypercoagulability. The etiology and duration of the

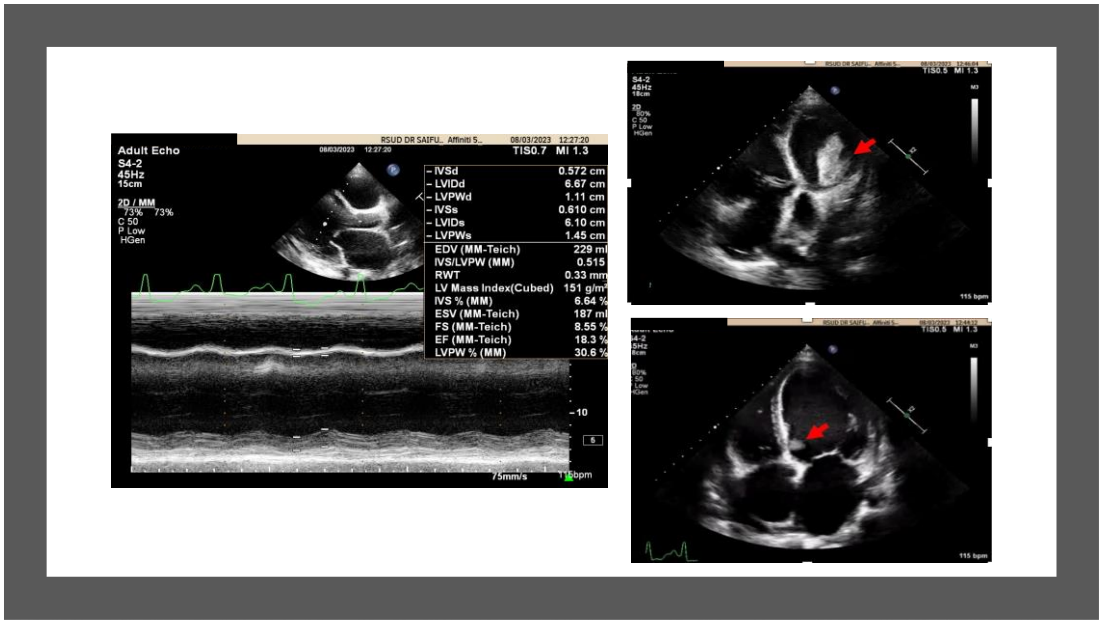

Figure 3. Transthoracic Echocardiography showed severe global LV systolic dysfunction and dilatation with mobile thrombus located at the basal inferoseptal region and massive thrombus measuring 4.64 cm x 1.83 cm is present at the basal mid anterolateral region

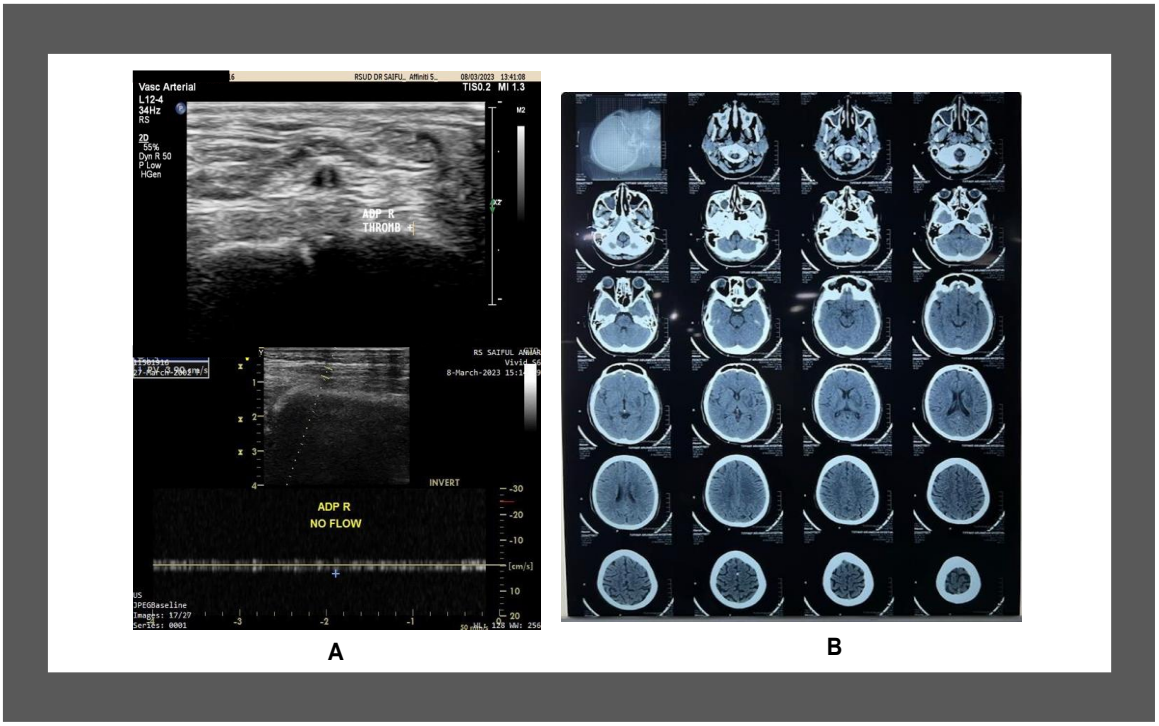

Figure 4. (A) The duplex ultrasonography examination showed the presence of a thrombus within the right dorsal pedis artery. (B) A head CT scan indicated the presence of an acute infarct in the left internal, external capsules and left corona radiata

myocardial dysfunction determine the relative contributions of these factors to the formation of LV thrombus [7]. TTE is commonly used for screening, but it has low sensitivity for left ventricular thrombus (LVT) detection. In the case, the patient had been diagnosed with PPCM five years ago; however, she had not consistently adhered to medication management and monitoring. She had significant LV systolic function was impaired as shown by a LVEF of 23%, dilatation of LV, and an ovoid-shaped hyperechoic mass-like lesion identified at LV indicative of a mobile thrombus and massive thrombus. This is related to the static factor attributable to reduced ventricular function which is included in one of Virchow's triad. Requiring the addition of Enhanced Contrast Agents (ECA) and/or use of CMR imaging. Intrinsic limitations reduce diagnostic accuracy, especially for small, non-protruding mural thrombi. Transesophageal Echocardiogram (TEE), Superior for detecting atrial thrombi, has a limited role in LVT detection; up to 46% of patients have inconclusive studies with TEE for LVT. ECA Improves image quality and blood-endocardial surface, is cost-effective, and increases echocardiographic sensitivity for LVT detection from 33% to 100% and specificity from 82% to 92% [7].

The management of LVT is dependent on the etiology that precipitated its formation. The primary medical treatment for left ventricular tachycardia is anticoagulation therapy. VKAs should be administered for a least of 3 to 6 months, with the duration according to the individual's risk of bleeding. The target international normalized ratio (INR) is 2.5, with a range of 2 to 3. It is recommended to perform

Grade	Category	Sensory loss	Motor deficit	Prognosis
I	Viable	None	None	No immediate threat
IIA	Marginally threatened	None or minimal (toes)	None	Salvageable if promptly treated
IIB	Immediately threatened	More than toes	Mild/ moderate	Salvageable if promptly revascularized
III	Irreversible	Profound, anaesthetic	Profound, paralysis (rigor)	Major tissue loss, permanent nerve damage inevitable

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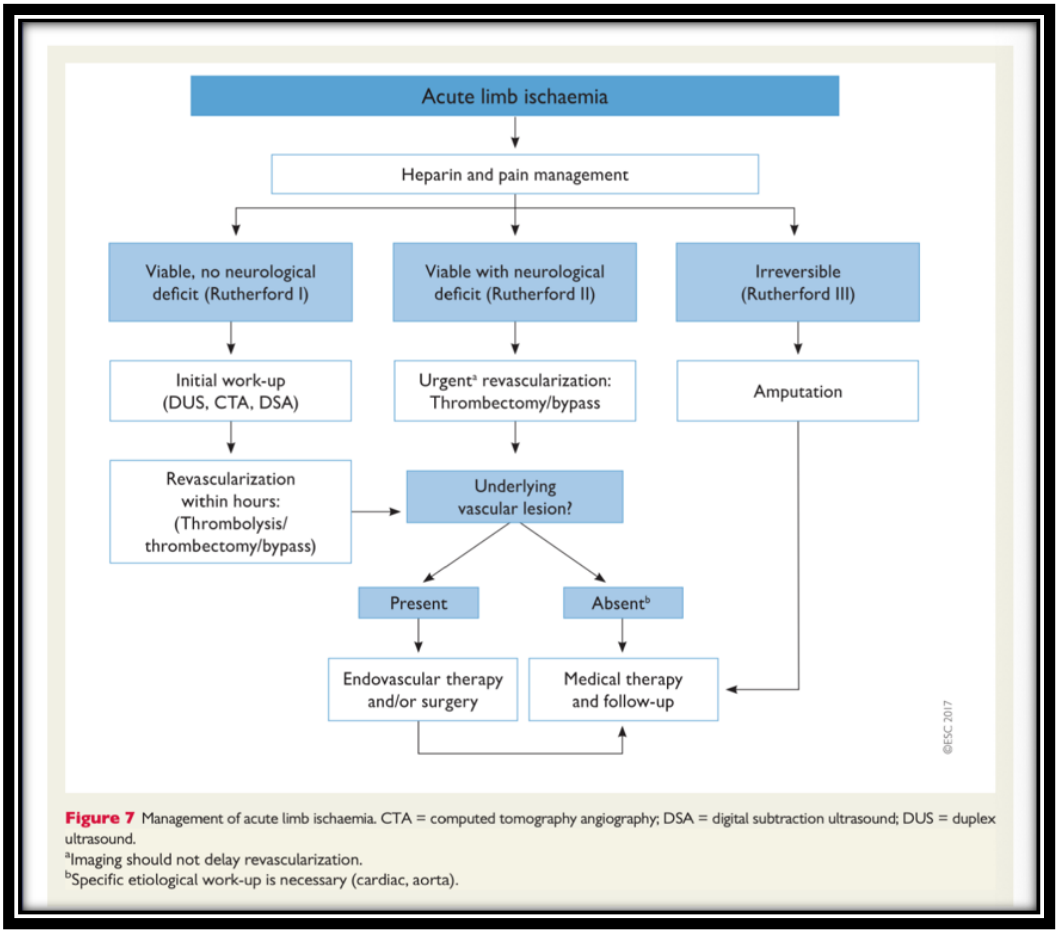

Figure 7 Management of acute limb ischaemia. CTA = computed tomography angiography; DSA = digital subtraction ultrasound; DUS = duplex ultrasound.
[a]Imaging should not delay revascularization.
[b]Specific etiological work-up is necessary (cardiac, aorta).

B

Figure 5. (A) Clinical categories of acute limb ischaemia. (B) Management of acute limb ischemia [9].

further imaging at the conclusion of the therapy period to evaluate the resolution of LVT. The combination of VKA with parenteral anticoagulation is appropriate because of the prothrombotic effect at the onset of therapy [7]. In the case, the patient got heparin administration, and the dosage was adjusted over five days. Following a period of five-day heparinization, the patient reported improved leg pain. However, a DUS scan showed the persistence of a thrombus at the site of the right dorsal pedis artery. The patient was discharged from the hospital and prescribed an angiotensin-converting enzyme (ACE) inhibitor, beta-blocker, mineralocorticoid receptor antagonist (MRA), and oral warfarin. The observed recurrence rate during a six-month period of anticoagulation was an important 18.5%. The potential efficacy and safety of DOACs make them beneficial alternatives to warfarin. Several case reports, case series, and short retrospective studies performed at a single center (n<140) have documented comparable effectiveness between DOAC and VKA in the treatment of LVT. However, all of them had very few embolic events and had short follow-ups [7].

The potential for embolization of LVT can lead to devastating outcomes such as stroke and systemic embolism. Systemic embolism can lead to ischemic events affecting other organs or limbs, causing acute limb ischemia (ALI). ALI occurs due to a sudden reduced arterial blood flow to the limb. The viability of limbs is at risk, requiring immediate intervention. After the clinical diagnosis has been confirmed, it is recommended to administer treatment with unfractionated heparin in conjunction with appropriate analgesic therapy.

The determination of the appropriate therapeutic approach and the assessment of the severity of the situation are contingent upon the clinical manifestation, primarily the existence of neurological impairments. Several revascularization methods may be employed, such as percutaneous catheter-directed thrombolytic therapy, percutaneous mechanical thrombus extraction or thrombo-aspiration (with or without thrombolytic therapy). Because of a decrease in morbidity and death rates, endovascular therapy is frequently favored, particularly in patients who have significant comorbidities. The surgical removal of the LVT is an option for patients who cannot tolerate anticoagulant therapy and are considered to be at a high risk of embolization. Thrombus extraction, thrombo-aspiration, and surgical thrombectomy are recommended for patients presenting with neurological deficits [9]. Due to a massive thrombi, there was an increased risk of further embolization. Consequently, surgical excision was advised, but the patient refused surgical excision. Then she routinely controlled (Figure 5 A.B)

4. Conclusion

The critical importance of early recognition and management of cardiac conditions, especially in young patients with DCM, was underscored. The patient's presentation with acute stroke and limb ischemia secondary to a massive intracardiac thrombus emphasized the potential complications of DCM, which could lead to life-threatening events (3). The case also highlighted the need for comprehensive multidisciplinary care, including cardiology, neurology, and vascular surgery, to optimize patient outcomes.

5. Declaration

5.1 Ethics Approval and Consent to participate
Patient has provided written informed consent prior to involvement in the study.

5.2. Consent for publication
Not applicable.

5.3 Availibility of data and materials
Data used in our study were presented in the main text.

5.4 Competing interests
Not applicable.

5.5 Funding Source
Not applicable.

5.6 Authors contributions
Idea/concept: FYN. Design: FYN. Control/supervision: CT, NK. Data collection/processing: FYN Analysis/interpretation: FYN, CT, NK. Literature review: FYN, CT, NK. Writing the article: FYN. Critical review: FYN, CT, NK. All authors have critically reviewed and approved the final draft and are possible for the content and similarity index of the manuscript.

5.7 Acknowledgements
We thank to Brawijaya Cardiovascular Research Center

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