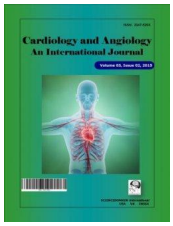

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Acute Limb Ischemia Due to Cardiac Thromboembolismin a Young Patient without Myocardial Infarction or Cardiomyopathy

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Authors' contributions

This work was carried out in collaboration between all authors. Author MK developed the idea presented in article and wrote the first draft of the manuscript. Authors GM, AA and MB did literature review, completed the discussion part and references. Author TKP managed the final review and approval before final submission. All authors read and approved the final manuscript.

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Case Study

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ABSTRACT

Acute limb ischemia secondary to systemic arterial embolism from left ventricular thrombus is a rare life threatening emergency. Peripheral arterial thrombosis superimposed on an atherosclerotic disease or thromboembolism from cardiac or aortic source are the two most common causes of acute limb ischemia. We present a case of a young healthy female who had recurrent admissions with acute lower extremity ischemia secondary to embolism from intra cardiac thrombus diagnosed by bedside doppler and computed angiogram, managed by surgical thromboembolectomy and discharge on anticoagulation.

Keywords: Ventricle thrombus; acute limb ischemia; embolism.

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1. INTRODUCTION

Acute limb ischemia is most commonly due to in-situ arterial thrombosis or distal thrombo or athero-embolism, and rarely associated with arterial dissection or aneurysm. It is an emergent condition that requires early intervention to prevent the fatal consequences like amputation, disability and death. We present a case of 29-year old young female admitted with recurrent acute ischemic limb due to thromboembolism from a cardiac source and had an emergent thromboembolectomy, fasciotomy followed by below right knee amputation and discharged on anticoagulation.

2. CASE DESCRIPTION

A 29-year-old smoker pregnant female with past medical history of superficial vein thrombosis and deep vein thrombosis (DVT) presented with sudden onset of left leg pain. It started with left foot numbness and tingling which then progressed to sudden onset of immense pain in the medial thigh associated with difficulty in ambulation. Patient denied any use of birth control pills, previous abortion or spontaneous miscarriages, recent trauma, immobilization, recent surgery or travel and drug abuse. Patient had a right lower extremity DVT in previous 2nd pregnancy, which was treated with lovenox. Patient also recently had a right upper extremity superficial vein thrombosis treated with aspirin. On admission, blood pressure was 127/99 mm Hg, pulse 112 beats per minute, respiration rate 12 per minute, temperature 97.9 F and body mass index 23 kg/m^2. Physical examination was remarkable for moderate distress, tachycardia, tenderness at the left medial thigh and mottled, dark, pale and cold left lower extremity. Patient also had decreased mobility of the right foot, absent bilateral posterior tibialis and dorsal is pedis pulses confirmed by bedside doppler consistent with acute limb ischemia of bilateral lower extremities and compartment syndrome on the left side. Labs were normal. The patient was started on heparin and had a stat computed tomography angiogram (CTA) after discussing the risks and benefits of radiation exposure that showed 50% stenosis of the right common iliac artery and 50% stenosis of left common and external iliac arteries. There was also extensive 80% thrombosis of the proximal left common femoral, left superficial and deep femoral arteries, with complete occlusion of the left superficial femoral artery, no blood flow to the both ankles. Further investigation showed that patient also had a 1.9 cm left ventricle thrombus which was later confirmed by transthoracic echocardiogram (TTE) [Fig. 1]. TTE showed normal left ventricular ejection fraction of 55-60% and a large apical thrombus that was 2.5 cm x 1.5 cm in size. Patient had an emergent bilateral aorto-iliac, femoro-popliteal and tibiopopliteal thromboembolectomy, left dorsal is pedis vein patch angioplasty and left lower extremity compartment fasciotomy. Patient had a hypercoagulable work up that includedanti-nuclear antigen (ANA), anti-nuclear cytoplasmic antigen (ANCA), anti-phospholipid antibodies (APA), Anti-cardiolipin Ab,anti-β2 glycoprotein, factor V Leiden ordered and defer to check Protein C, Protein S, and antithrombin III since acute thromboembolic event would have interfered with the interpretation. Patient was switched from heparin to full dose lovenox on discharge. Biopsy ofthe clot from right and left femoral and tibial arteries showed organized blood coagulum compatible with thromboembolism. Hypercoaguable work up came back negative except for heterozygous positivity for factor V Leiden mutation. Patient was discharge home on lovenox.

Patient was re-admitted 2 weeks post discharge with acute ischemia of the left lower extremity. Doppler ultrasound showed occluded left superficial femoral and popliteal artery. Patient had an emergent thromboectomy, patch angioplasty on left side and discharged home on lovenox. Repeat TTE showed decrease in the size of left ventricular apical thrombus to 1.9 cm x 0.9 cm. Patient was re-admitted third time a week later with acute bilateral leg ischemia and had a redo right aortoiliac, bilateral femoropopliteal and tibiopopliteal, left redo posterior tibial artery and right dorsalis pedis artery thromboembolectomy and fasciotomy on right side to relieve the pressure due to compartment syndrome. Histopathology of the clot was again compatible with thrombus. Patient was switched from lovenox to heparin inpatient due top resumed lovenox failure. Patient later had termination of pregnancy as that was the only possible explanation for persistent hypercoaguable state leading to recurrent spontaneous thrombosis. Patient also had right below knee amputation before discharge and was started on apixaban.

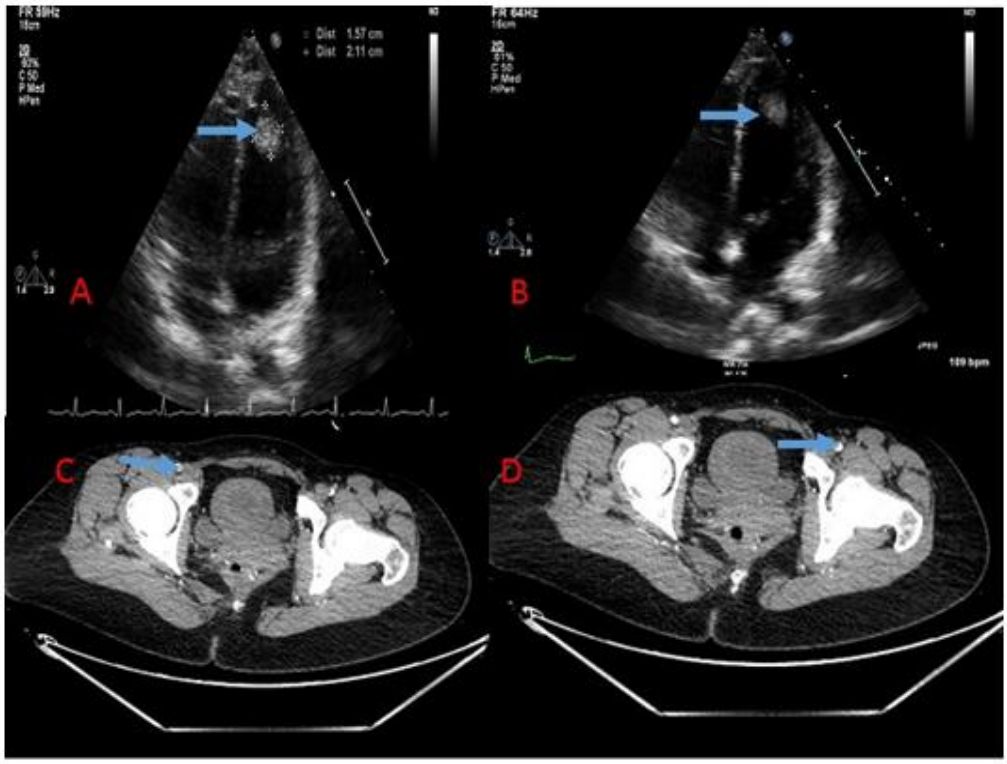

Fig. 1. A-B Echocardiogram showed left ventricle Thrombus (Blue arrows). C-D CT angiogram showed peripheral arterial embolus (Blue Arrows)

3. DISCUSSION

Acute limb ischemia is a sudden lack of blood supply to a limb most commonly due to arterial thrombosis or embolism. The two most common categories of acute limb ischemia are either traumatic or non-traumatic. Acute ischemia usually presents with sudden onset of pain, pale and mottled dark skin with loss of distal pulses on physical examination. Acute limb ischemia can result in loss of limb if left untreated or if there is delay in treatment. Acute limb ischemia secondary to peripheral arterial embolism from a left ventricular thrombus is a an uncommon presentation, especially in the absence of myocardial infarction, left ventricular dysfunction, arrhythmias, structural or valvular heart disease and dilated cardiomyopathy. Left ventricular thrombususually presents as complication of anterior myocardial infarction and dilated cardiomyopathy. Usually, large mobile protruding thrombus is associated with high risk of embolization [1].

Caseshave been reported about left ventricle thrombus associated with left ventricular dysfunction post myocardial infarction, left ventricle aneurysm and dilated cardiomyopathy presenting as acute limb ischemia, renal and splenic infarcts due to thromboembolism [2-6]. Left ventricular thrombus formation following myocardial infarction is common in the first few months and is usually seen with large anterior infarction involving left anterior descending artery and follows the principle of the Virchow's triad (hypercoagulable state, stasis of blood in the ventricle and endothelial injury); left ventricle akinesia or dyskinesia resulting in blood stasis, ischemia leading to subendothelial injury with inflammatory reaction and hypercoagulable state due to acute coronary syndrome. Study reported by Karen et al showed that ventricle thrombus complicating myocardial infraction usually resolves especially seen with apical akinesia than apical aneurysm or dyskinesia. [7]. Study reported by Jugdutt et al. showed left ventricular thrombus in 7-46% patients with acute myocardial infarction. [8].

It is not uncommon to see left atrial/ventricle thrombus associated with atrial fibrillation due to stasis of blood in the heart, leading to thrombus formation and usually one of the most common causes of intra cardiac thrombus. Jun H et al.

reported a case of distal arterial thromboembolism secondary to left ventricle thrombus related to spontaneous coronary artery dissection complicating as left heart failure [9]. The ACC/AHA (American College of Cardiology/American Heart Association) guidelines recommended anticoagulation in patients with left ventricle thrombus [10], while ACCP(American College of Chest Physicians) recommended anticoagulation in those patients who are at high risk of thromboembolism include with large anterior infarction, apical akinesia or dyskinesia or left ventricular dysfunction and atrial fibrillation associated with myocardial infarction [11].

The physical signs of acute limb ischemia are six P's (pain, pallor, pulselessness, poikilothermia, paralysis and paresthesia). Diagnosis is made by doppler ultrasound, computed tomography angiogram or magnetic resonance angiogram. Echocardiogram is a very sensitive and specific tool for detection of mural thrombus and to look for different features like shape, mobility and protrusion into the ventricular cavity that are related to the embolization. Study done by Andre et al. [12] showed that 2 D echocardiogram should be done in patients with acute myocardial infarction patients before discharge to look for ventricular thrombus, determine the risk of embolization and to identify those patients who are at risk of developing thrombus.

Studies have reported increased risk of venous thromboembolism during pregnancy related hypercaoguable state due to increased production of pro-coagulants, decrease in anticoagulation factors, and stasis of blood due to immobilization. Only few case reports have been published about arterial thrombosis or ventricular thrombus during pregnancy presenting as limb ischemia and gangrene [13-15]. Stduies have reported left ventricle thrombus complicating peripartutm cardiomyopathy due to hypercoaguable state and left ventrcular dysfunction diagnosed by echocardiography and usually resolves with anticoagulation or thrombectomy [16-18]. Several other risk factors that increased the risk include smoking, hypertension, and obesity.

Left ventricular thrombus presenting with distal emboliin the absence of myocardial infarction, ventricular aneurysm or dilated cardiomyopathy is very rare. Hypercoaguable work-up in our patient as discussed above came back negative except for heterozygous positivity for factor V Leiden mutation. The only possible reason for thrombus formation in our case could be hypercoagulable state and blood stasis related to pregnancy in addition to being heterozygous for factor V Leiden that ended up in the termination of pregnancy and recurrent bilateral thromboembolectmy, compartment fasciotomy and eventually right lower extremity below knee amputation.

4. CONCLUSION

Systemic arterial embolism secondary to left ventricular thrombus especially in the absence of myocardial infarction or dilated cardiomyopathy is very rare. Pregnancy is a hypercoaguable state associated with venous and arterial thrombosis. This case highlights the importance of pregnancy related hypercoaguable state and stasis of blood due to immobilization causing acute limb ischemia due to recurrent thromboembolism, which eventually led to termination of pregnancy to prevent future risks.

CONSENT

As per international standard or university standard, patient's consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard written ethical permission has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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