Mesenteric ischemia following large left ventricular fibroid thrombosis due to myocardial infarction: A case report

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ARTICLE INFO

ABSTRACT

INTRODUCTION: Left ventricular thrombosis is a common complication of acute myocardial infarction, usually occurring after anterior ST-elevation myocardial infarction, akinesis, and extensive dyskinesia of the apex, anterolateral, or anteroseptal. In this article, we report a case of myocardial infarction with left ventricular thrombosis.

CASE PRESENTATION: A 45-year-old man was referred to our hospital with complaints of severe epigastric pain, sweating, fever, and tachycardia. In laboratory tests, findings for triose phosphate isomerase enzyme were negative, but on electrocardiography, the Q wave in the V1 and V2 leads and the biphasic T wave in the V2, V3, and V4 leads were evident. In Akinesian echocardiography, apical segmentation with a large organic, mobile, pedunculated thrombosis measuring 1.7×1.9 cm^2 and an ejection fraction of 40% were reported. The patient then underwent emergency open cardiac surgery through a central sternotomy to remove the thrombosis.

CLINICAL DISCUSSION: The clinical manifestations of left ventricular thrombosis include cerebral thromboembolism and systemic distal embolization, which are dangerous despite surgery. The echocardiography revealed that the left ventricular keratosis had been surgically removed through ventriculotomy. The patient experienced mesenteric ischemia during hospitalization, and due to the initial presentation of severe abdominal pain, it is not uncommon for the patient to be diagnosed with mesenteric ischemia before referral. The patient had the following vital signs: SPO$_2$, 98%; BP, 96/63; PR, 91; RR, 19; and GCS, 10/15 and was treated in the intensive care unit.

CONCLUSION: Our case highlights the importance of diagnosis and on-time treatment of post-large left ventricular fibroid thrombosis complications.

1. Introduction

Left ventricular thrombosis (LVT) is commonly observed in patients with decreased systolic function following a ST-elevation myocardial infarction [1]. Its prevalence after acute myocardial infarction (MI) is 34–39% [2]. Echocardiography is the primary diagnostic tool for LVT, which is visible in the left ventricle [3]. The occurrence of LVT is associated with various clinical manifestations, such as embolic phenomena and acute irreversible heart failure, and its most severe manifestation is distal systemic embolization, usually occurring during the first 3–4 months after infarction [4]. The main clinical outcome of thromboembolism is heart stroke. Thrombus displacement and protrusion are two features associated with increased embolic potential. As large and mobile thrombi are relatively rare, no studies have suggested the real risk of thrombosis embolization. In addition, there is limited information on the management of such patients, especially those with low ejection fraction (EF). For such cases, left ventriculotomy is the best treatment option [5].

2. Case report

A 45-year-old man with no history of specific drug use, chronic comorbidities including diabetes and hypertension, and history of smoking and alcohol intake was referred to our emergency room with severe epigastric pain, fever, sweating, and tachycardia. His vital signs were as follows: blood pressure, 140/90; heart rate, 130; respiration rate, 22; oral body temperature, 38.5 °C; and SPO$_2$, 96%. He had abdominal tenderness, and upon checking for heart sounds, S1 and S2 were heard without a souffle. Friction rub was not audible, and breathing sounds were normal. There was no lymphadenopathy or intermittent pulses in the limbs. In the initial
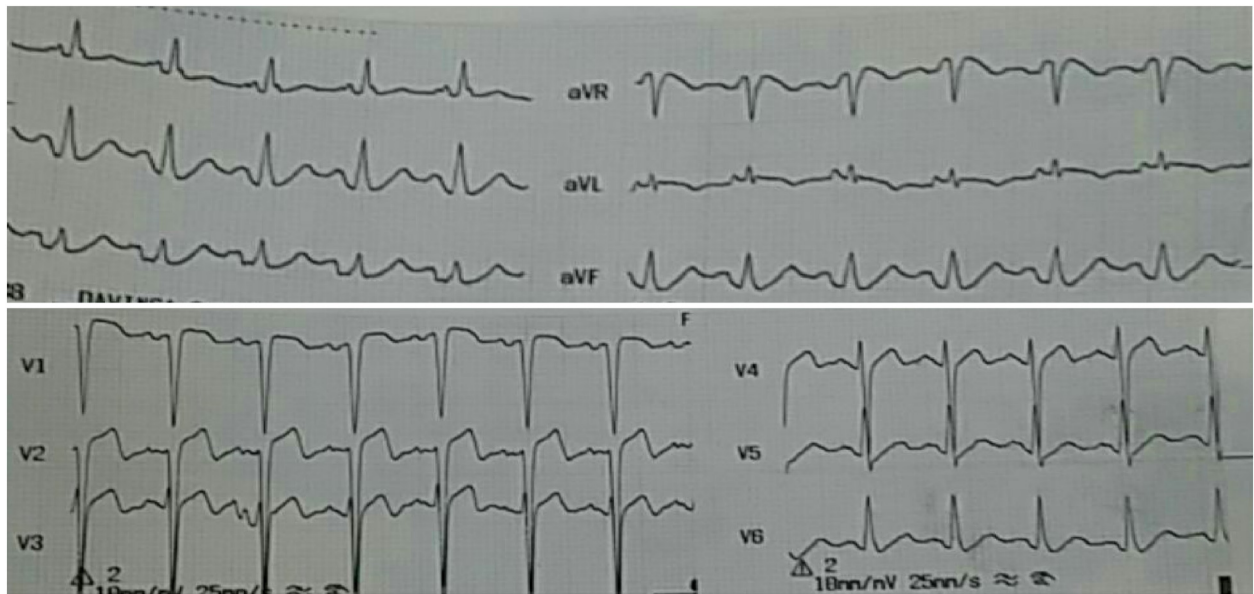
Fig. 1. First ECG after entering to hospital.

Fig. 2. Left ventricular thrombosis.

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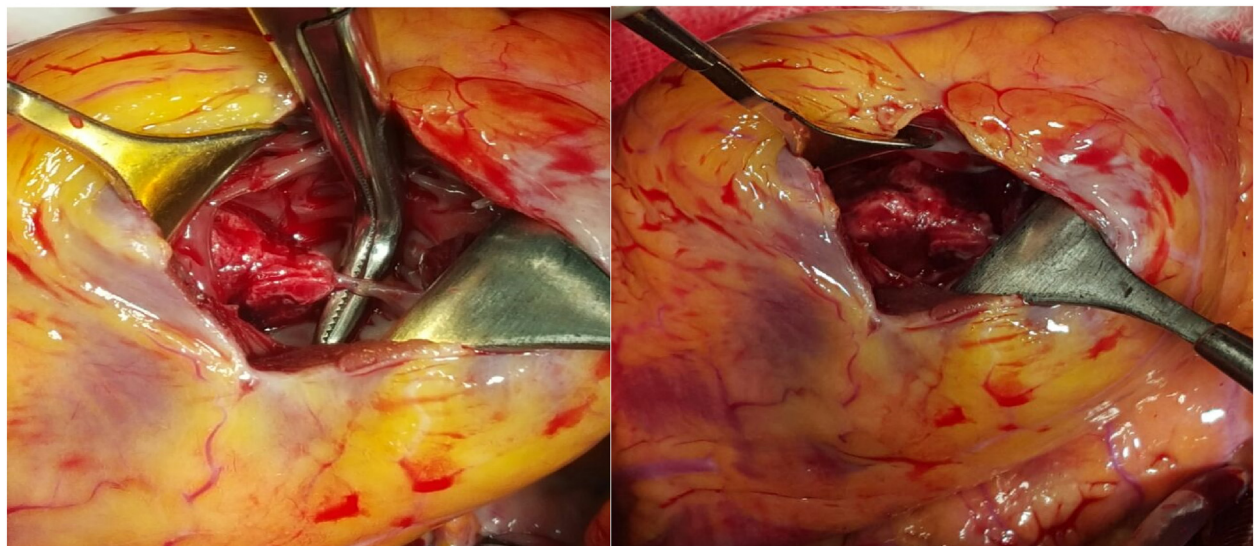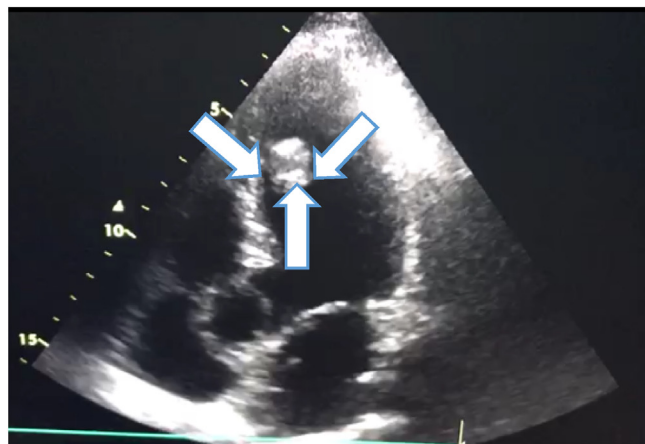
tests, the troponin level was negative and other findings were normal (WBC, 17100; HCT, 48.6; HB, 16.6; FBS, 118; CHOL, 147; INR, 1.14; PT, 13.5; PTT, 25; amylase, 88). In the patient's initial electrocardiogram (ECG), he had sinus rhythm with a heart rate of 130; Q wave in the V1 and V2 leads; and a biphasic T wave in the V2, V3, and V4 leads, indicating negligible MI. Following the American College of Cardiology/American Heart Association guidelines, aspirin 300 mg, plavix300 mg, and atorvastatin 80 mg were administered to the patient for the secondary prevention of coronary artery disease. On echocardiography, moderate left ventricular dysfunction with an EF of 40% and a large organic, mobile, pedunculated thrombosis measuring 1.7×1.9 cm^2 were observed in the apical septum. Coronary angiography was performed for the patient according to the sample and ECG evidence. The left descending artery was totally cut off, and the left circumflex coronary artery had significant proximal stenosis. Meanwhile, the right circumflex artery and the other arteries were normal. Studies have shown that apical aneurysms caused by an asymptomatic heart attack may lead to a clot. Due to the echocardiography findings and his high risk of embolization, he was referred for emergency open-heart surgery and coronary artery bypass grafting. A cardiac surgeon with 14 years of experience performed the cardiopulmonary bypass. Necessary care was taken to limit manipulation of the left ventricle during convolution to prevent the movement of the apical thrombosis. Anterograde cardioplegia was considered to protect the myocardium. (LAD and OM1, respectively). After incising the left atrium, the LVT measuring 1.2×1.8 cm^2, with a thin base attached to the apical septal wall, a creamy brown texture, and a soft consistency was carefully removed. It weighed 311 g. and its sedimentary layers of red, white globules and fibrin were then examined microscopically. The patient underwent cardiopulmonary pumping for 50 min and was successfully isolated and transferred to the intensive care unit (ICU). His post-surgical vital signs were: BP, 120/91; PR, 113; RR, 17; and SPO$_2$, 94%. The patient was treated with warfarin 5 mg once a day and metoprolol 25 mg twice a day. Regular monitoring of the patient was performed, and the results of postoperative tests were as follows: WBC 22300; HCT, 49.4; HB, 15.6; BS, 139; Cr, 1.8; Mg, 2.7; K, 4.9; Ca, 8.3; INR, 1.6; PT, 16; and PTT, 27.2.

Two days after surgery, the patient suffered from severe abdominal pain associated with swelling, distension, tenderness, generalized rebound, and no defecation. Due to the elevated Cr level, abdominal and pelvic CT scans were performed with oral contrast, revealing dilatation in some small intestinal lobes and evidence of intestinal pneumatosis. Free fluid was also observed in the abdominal and pelvic cavities. Due to the indication for surgery and use of warfarin, the patient underwent surgery. Approximately 2 L of gastrointestinal and purulent discharge was extracted from the abdominal cavity. Examination of the intra-abdominal viscera revealed gangrenous necrosis 30 cm from the ligament of Treitz to the end of the ascending colon. Narrow bowel and ascending colon resection was performed, and the proximal end of the small intestine was osmotically removed from the abdomen, which was washed with plenty of normal saline. Finally, a nylon drain was placed in the right paracolic region and the liver bed. Two days after surgery, the patient experienced gastric and generalized abdominal distension, and based on a diagnosis of peritonitis, the abdomen was opened at the previous incision site to remove 2 L of blood and clots. The abdomen was then washed with plenty of normal saline. On abdominal examination, the stoma was healthy, and the color of the intestines was normal. The distal colon was intact, and there was no obvious bleeding inside the abdomen, but diffuse oozing was evident, which was controlled as much as possible with a catheter. In addition to the previous one, another nylon drain was embedded in the pelvic floor. The abdomen was then closed along the anatomical plane, and the intubated patient was transferred to the ICU. Due to the history of warfarin use and significant

Fig. 3. Left ventricular thrombosis resection.

bleeding in the peritoneal space, the patient was transfused with 6 units of fresh frozen plasma, 10 units of platelets, and 1 unit of platelet concentrates. On microscopic examination, the ileocecum and colon appeared resected, with the ileum measuring 24 cm in length and 3 cm in diameter. The colon and cecum were 110 cm in length and 25 to 4 cm in diameter. The outer surfaces of the colon, scapula, and ileum were covered with fibrin exudates. In the colonic incisions, the closest multiple necrotic areas observed were 9 cm from the distal margin. The polyp was not seen with a tumor lesion, and the ileum surface showed no pathological findings. In the microscopic description of the prepared incisions, colonic mucosal necrosis was visible throughout the wall with hemorrhage and acute dilative reaction with inflammation affecting the adjacent fat. Newly-blocked thrombosis was observed in some vessel walls. Acute fibrinous dilation exudate was also observed at the level of the small intestinal serosa. The patient experienced atrial fibrillation during hospitalization, and amiodarone was infused into the sinus. With vital signs of BP, 96/63; PR, 91; RR, 19; SPO$_2$, 98%; and GCS, 10/15, the patient was treated in the ICU. The patient was satisfied with the treatment as he received the appropriate nursing and medical care interventions. This work was reported in line with the SCARE 2020 criteria [6] (Figs. 1–3).

3. Discussion

In this study, the prevalence of LVT after acute MI was 0.7%. According to recent studies, LVT 3 months after an acute MI is rare [7]. However, in our case, the clinical signs and ECG revealed simultaneous recent neglected MI and LVT, and the patient probably had clinical manifestations, such as chest pain, which he might not have noticed due to his history of alcohol and drug use. He also suffered from severe left ventricular dysfunction (EF: 40%). The main modality for diagnosing LVT is echocardiography, which can visualize the mass in the ventricle. Though CT and MRI are more effective, these are less likely to be used due to the high risks and costs associated with them [8]. In this patient, primary echocardiography using Septo Epic revealed moderate left ventricular dysfunction (EF: 40%) and a large organic, mobile, pedunculated thrombosis measuring 1.7×1.9 cm^2. Most descriptive and meta-analytic studies have reported embolic events in patients with LVT in the first 3–4 months [9], while case studies have shown an incidence of 33%; it mainly occurs in elderly individuals and those with deep negative T-waves in an initial ECG. According to research, the risk of embolization depends on thrombotic motility, left ventricular protrusion, and pedunculated appearance. However, no study has yet to explain the exact mechanism of pedunculated thrombus evolution. The patient's ECG showed negative T waves,

followed by surgery and LVT, severe abdominal pain, and generalized abdominal pain, indicating mesenteric ischemia, possibly caused by a systemic embolism originating from the LVT. Narrow bowel and ascending colon resections were performed. The treatment methods for LVT include anticoagulant administration and dual antiplatelet therapy along with the anticoagulants used in surgery. Except for a few case studies, there is little information on the role of direct oral anticoagulant administration in the treatment of LVT.

In our case, the patient underwent immediate surgery to prevent thromboembolism. In a case study, Williamson et al. reported a useful technique for removing LVT that involved using an endoscopic and transverse aortic camera. This technique can be used as an alternative to left ventriculotomy [10], which was not possible in our patient due to lacking equipment. Ventriculotomy is usually associated with cardiac arrhythmias and a decrease in depletion, with the latter being observed more in longitudinal ventriculotomy than in apical ventriculotomy [11]. Although there are limited articles, mostly case reports, cardiac endoscopy appear to help visualize left ventricular lesions [12]. However, direct vision is often replaced with a two-dimensional view [13]. In the present study, due to the lack of equipment, cardiac endoscopic surgery was not performed, and the LVT was removed through left ventricular ventriculotomy, thus reducing the risk of cardiac arrhythmias and EF loss. Our case highlighted the importance of diagnosis and on-time treatment of post-large LVT complications.

4. Conclusion

LVT may lead to cerebral thromboembolic events and systemic distal embolization, and these risks are not alleviated by surgery. In this study, the LVT was detected by echocardiography and removed by ventriculotomy. The patient experienced mesenteric ischemia during hospitalization, but due to the severe abdominal pain on initial examination, the diagnosis of mesenteric ischemia before the patient's visit is not unlikely. The patient had the following vital signs BP, 96/63; PR, 91; RR, 19; SPO_2, 98%; and GCS, 10/15 and was treated in the ICU.

Declaration of Competing Interest

The authors report no declarations of interest.

Sources of funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical approval

The Study Protocol was approved by the Research and Ethics Committee of Neyshabur University of Medical Sciences (IR.NUMS.REC.1399.030).

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Dr. Ali Azari and Omidreza Amini has designed the concept of the study, literature review, Data Collection and analysis. Dr. Rasool lakziyan, Zohreh Sarchahi has contribution in study concept design, treatment of the patient and manuscript writing.

Registration of research studies

Not Applicable.

Guarantor

Zohreh Sarchahi.

Provenance and peer review

Not commissioned, externally peer-reviewed.

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