Totally occluded distal left anterior descending artery caused by distal embolization of left main coronary artery thrombus; which is the best treatment?

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Male/46, Rest chest pain

Present Illness:
He was diagnosed as stable angina for effort chest pain 1 year ago, he did not any medication. He had been exertional chest pain for the past few weeks and on the very day, he complained of the severe chest pain which was sudden onset, unremitting and lasting over 60 minutes.

Cardiovascular risk factor: 1 pack/day X 25 years
Alcohol: Social

Vital Sign: 36.5 °C – 20 – 75 BPM – 138/86 mmHg
Physical Exam: Regular heart beat without murmur
Aspirin & Clopidogrel administration.
Coronary angiogram

At first Glycoprotein IIb/IIIa receptor antagonist and heparin were IV injected.
PCI for LMA lesion

After wiring & IVUS exam

7Fr Cordis XB 3.5 guiding catheter and Route coronary guidewire

IVUS image

hazy appearance of pLMA,

plaque rupture with embolization into
PCI for LMA lesion

Balloon dilatation

After Ballooning

Apollo 2.0x 20 mm balloon.
PCI for LMA lesion

Stenting

Post-stenting

4.0x 16 mm PROMUS Element stent
PCI for LMA lesion

High pressure ballooning

After high pressure ballooning

Apollo 4.0 x 10 mm
PCI for LMA & LAD lesion

IVUS exam after stenting

Aspiration at dLAD lesion

IVUS image at LMA

7F export catheter

Good stent apposition in LMA
PCI for LMA & LAD lesion

Final Angiogram – RAO caudal

TIMI 1 flow remained in dLAD

Remnant embolized thrombi of dLAD was planned to be treated medically by anti-platelet and anticoagulation agents.

Final Angiogram – RAO cranial

some white thrombi were aspirated, TIMI3 flow was not achieved in dLAD.
Clinical course

Cardiac Marker:
Early peak suggesting adequate reperfusion therapy.

Hypercoaguability study

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Lipid profile:

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Follow up coronary angiogram;
After 3 days of subcutaneous LMWH injection

Left coronary artery
patency of dLAD; some filling defect

Right coronary artery
TIMI III flow in all coronary vascular beds.

Discharge med.; aspirin, clopidogrel, cilostazol, statin, b-blocker, ARB
Lesson (1); What is the best treatment to manage the STEMI caused by distal embolization of LMA thrombus?

A Case of Acute Myocardial Infarction Caused by Distal Embolization of a Left Main Coronary Artery Thrombus

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ABSTRACT

Coronary embolism is an uncommon cause of myocardial infarction. A 46-year-old male presented with typical chest pain of an MI. There was no definite ST segment change on electrocardiogram (ECG) and no elevation of cardiac enzymes. Coronary angiography (CAO) revealed occlusion of the distal left anterior descending coronary artery (dLAD), the distal left circumflex coronary artery (dLCX), the diagonal branches (DI), and the obtuse marginal branch (OM) with a large filling defect in the left main coronary artery (LMA) that caused the myocardial infarction. We considered the possibility that coronary embolization was caused by the migration of a thrombus in the LMA during CAO. We did balloon angioplasty in the dLAD, dLCX, OM, and DI and treated the patient with glycoprotein IIb/IIIa receptor antagonist. However, thrombi remained in the dLAD, OM, and dLCX. After 3 days of anti-thrombotic treatment, follow-up CAG revealed only slight resolution of thrombi in the LAD. After triple antiplatelet agent medication for 1 year, a follow-up CAG showed a resolution of the thrombi in all coronary arteries.

1. Anticoagulation medication

A Successful Management for Acute Thrombotic Myocardial Infarction with Abciximab in a Nephrotic Syndrome

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ABSTRACT

A rescue percutaneous coronary intervention was performed using repeated angioplasties with a 3.0 mm balloon. However, the filling defects and distal LAD flow did not improve. We administered Abciximab (ReoPro®), and the LAD flow improved to a TIMI III flow, with resolution of the thrombus in the LAD.

2. Mechanical thrombus aspiration

A Case of Acute Myocardial Infarction Caused by Distal Embolization of a Left Main Coronary Artery Thrombus

We did balloon angioplasty in the dLAD, dLCX, OM, and DI and treated the patient with glycoprotein IIb/IIIa receptor antagonist. However, thrombi remained in the dLAD, OM, and dLCX. After 3 days of anti-thrombotic treatment, follow-up CAG revealed only slight resolution of thrombi in the LAD. After triple antiplatelet agent medication for 1 year, a follow-up CAG showed a resolution of the thrombi in all coronary arteries.

No conclusive evidence & several case reports.

According to the case reports, the treatment strategy is various.
Lesson(1); What is the best treatment to manage the STEMI caused by distal embolization of LMA thrombus?

Acute Coronary Syndrome Caused by a Mobile Mass in the Left Main Coronary Artery

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Myocardial infarction caused by distal embolisation of a ruptured left main plaque

A 54-year-old man presented with a non-ST elevation myocardial infarction. Coronary angiography demonstrated a large thrombus in the distal left main (LM) stem, and a thrombosis subtotal occlusion of the distal left anterior descending (LAD) artery with TIMI grade 1 flow (lower left panel, A). He was discharged following conservative management with aspirin and clopidogrel; however, he experienced ongoing angina and dyspnea. Repeat angiography four weeks later demonstrated an increased thrombus in the distal LM stem, and an normal LAD with normal angiographic flow. There was no angiographic disease at the site of previous occlusion. Intracoronary ultrasound (IVUS) was performed demonstrating a large perforated plaque in the distal LM (upper right panel, A-C). Blood spicules were seen within the plaque, suggesting a recent plaque rupture with embolization of its contents. It was felt the ruptured plaque may provide a substrate for further thrombotic and/or embolic events. Percutaneous coronary intervention was performed with a 20 × 20 mm Taxus stent (Boston Scientific, Massachusetts, USA) deployed in the distal LM and proximal LAD achieving an excellent angiographic and IVUS result (lower right panel, A-C). Rupture of an atherosclerotic plaque may lead to large thrombus formation at the site of plaque rupture. Alternatively, as demonstrated in this case, thrombus may embolise causing coronary occlusion downstream within the dependent vascular territory. When investigating patients with acute coronary syndromes the possibility of downstream embolization from proximal plaque disease should be considered. Further development of technology able to target lipid-rich vulnerable plaque may have a role in preventing plaque rupture and acute coronary thrombosis.

3. CABG

Myocardial infarction caused by distal embolisation of a ruptured left main plaque

3. CABG

We present a case with an unusual angiographic presentation of a coronary thrombus in the left main coronary artery, which was managed with coronary artery bypass grafting. A 54-year-old man entered due to intermittent nocturnal chest pain.

4. Stent implantation

Appropriate treatment of STEMI caused by distal embolization of LMA thrombus remains a therapeutic challenge. Considering the coronary anatomy, clinical stability and the hemodynamic condition, we have to choose the most effective treatment modality; anticoagulation medication, mechanical thrombus aspiration, stent implantation and CABG.
Lesson 2; If the TIMI III flow is not achieved, how do we plan for better treatment outcome?

1. A Successful Management for Acute Thrombotic Myocardial Infarction with Abciximab in a Nephrotic Syndrome

Accelerated tissue type plasminogen activator (100 mg) was administered at the emergency room, but his chest pain continued, with persistent ST segment elevations. An urgent coronary angiograph revealed huge multiple filling defects, suggestive of thrombi in the proximal left anterior descending artery (LAD), with thrombolysis in the myocardial infarction (TIMI) flow. A rescue percutaneous coronary intervention was performed using repeated angioplasties with a 3.0 mm balloon. However, the filling defects and distal LAD flow did not improve. We administered Abciximab (ReoPro®), and the LAD flow improved to a TIMI III flow, with resolution of the thrombus in the LAD. His clinical course was uneventful after discharge, and a left coronary angiogram, at the 6-month follow up, showed no filling defects, with the TIMI III flow maintained.

2. A Case of Successful Primary Coronary Intervention for the Total Occlusion of Left Main Stem with the Aid of Abciximab

We performed direct coronary intervention using kissing balloon technique with the aid of Abciximab infusion. Residual stenosis with thrombus remained even after high pressure balloon dilatations, therefore we placed two stents, one in the ostia of left anterior descending (LAD) and the other in left circumflex artery (LCX). Coronary angiogram after kissing stents showed improved LAD and LCX flows without residual stenosis. Follow-up coronary angiogram taken one week later showed patent previous stented arteries.
Lesson 2; If the TIMI III flow is not achieved, how do we plan for better treatment outcome?

1. How long will be anticoagulation therapy administrated?


We considered the possibility that coronary embolization was caused by the migration of a thrombus in the LMA during CAG. We did balloon angioplasty in the dLAD, dLCX, OM and D and treated the patient with glycoprotein IIb/IIIa receptor antagonist. However, thrombi remained in the dLAD, OM, and dLCX. After 3 days of anti-thrombotic treatment, follow-up CAG revealed only slight resolution of thrombi in the LAD. After triple antiplatelet agent medication for 1 year, a follow-up CAG showed a resolution of the thrombi in all coronary arteries.

2. Which is the best drug?


Due to the fact that the angiographically confirmed embolus did not resolve within 4 days of treatment with aspirin, clopidogrel and low molecular weight heparin (LMWH), we intravenously administered bivalirudin instead of LMWH for another 2 days and could demonstrate complete resolution of the embolus following this protocol. No bleeding complications or recurrence of myocardial ischemia occurred.

If the TIMI 3 flow is not achieved, adequate antithrombotic therapy must be prescribed and follow up CAG may be considered to change the treatment method in embolized vessel.
There are various strategies to treat the AMI caused by distal embolization of LMA thrombus such as anticogulation medical therapy, mechanical thrombus aspiration, stent implantation and CABG.

**Take home message**

- These various treatment strategies have both merits and demerits.
- There is no reliable evidence which is the most effective therapy.
- It is not clear what is the routine treatment of LMA thrombus.

**Which is the best treatment?**

- In my opinion, I suggest that the one of the best treatment options is **stent implantation at LMA and anticoagulation therapy at distal embolized vessel lesion.**