ECMO Support Complicated with Early Multiple Stents Thrombosis Post Primary PCI- Case Report

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Abstract

Introduction: 1yr PCI+ECMO in the setting of cardiac-arrest and cardiogenic shock is challenging. Data has shown promising results in mortality reduction.

Case presentation: 57y man admitted with NSTEMI. LVEF-35%. 6-hours later he developed LBBB and taken for primary PCI. CAG: proximal occlusion-LAD, Tight lesion-Big ramus, normal-LCX and CTO-RCA. PCI to LAD and ramus were done. After stent-deployment, he developed cardiac-arrest. CPR initiated, IABP inserted and TPM was placed, he revived after 1.5hours of CPR. LVEF 10%. So peripheral VA-ECMO was inserted for cardio respiratory support and we could be able to wean it off successfully after 5 days from deployment.

He developed severe thrombocytopenia so, clopidogrel stopped & aspirin continued. After 36hours of ECMO removal, sudden clinical-deterioration was observed with severe shock again. EF 15%. Re look Angio revealed: all stents occluded thrombi. Aspiration thrombectomy done and hemodynamics was supported with IABP again. He also developed pneumonia and septic-shock and VA-ECMO implanted again. This time we could wean off ECMO. On the 30th Post cardiac arrest, ECMO was explanted due to oxygenator clotting. Next day he was declared dead.

Conclusion: Our case is an example where a seemingly well doing patient after ECMO implantation, deteriorated all the way to death due to diagonally opposed balance between the risk of bleeding due to DAPT and heparin and the risk of stent thrombosis if that therapy is withdrawn.

Further studies are required to carve out the anti-platelet strategy in patients with peri-arrest primary PCI+ECMO. Timing of insertion of ECMO may be crucial as if it is done earlier in such patients with STEMI+cardiogenic shock may lead to a less complicated course and more fruitful outcome.

Keywords: ECMO; PCI; Cardiogenic shock; CPR

Introduction

Primary PCI is the treatment of choice for patients with acute ST elevation Myocardial Infarction (STEMI) and has been shown to significantly reduce mortality. Primary PCI in the setting of cardiac arrest is challenging, data has shown promising results in mortality reduction but however shock, hypothermia and changes in anti-platelet pharmacokinetics and stent thrombosis in peri-arrest milieu are feared devastating complication [1,2]. Extra-corporeal Membrane oxygenation (ECMO) is on the move as a supporting bridge for recovery but Data is scarce in this population group about the appropriate strategy for anti-platelet therapy [3]. Despite advances in coronary revascularization and widespread use of primary percutaneous interventions, cardiogenic shock complicating an acute ST-elevation myocardial infarction remains a clinical challenge with high mortality rates [4]. Conservative management with catecholamines is associated with serious limitations, including arrhythmias, increased myocardial oxygen consumption, and inadequate circulatory support. Clinicians have therefore turned to mechanical means of circulatory support [5,6]. We present a case of early stent thrombosis in a patient who underwent primary PCI for acute ST

elevation MI and had cardiac arrest during the procedure; while ECMO was inserted for support.

Case Report

A 57 year gentleman, smoker, recently discovered to be Diabetic and dyslipidemic was admitted with initial diagnosis of NSTE-ACS. Initial ECG's showed dynamic ST depression in precordial leads. Initial Echocardiography showed Moderate-severe LV dysfunction, LVEF -35%. Six hours later the patient had chest pain again and developed acute LBBB and was taken for primary PCI. Coronary Angiography revealed proximal total occlusion of LAD, Severe disease in a good sized ramus, a normal LCX and a totally occluded RCA filling retrograde from LAD by collaterals. PCI to LAD (culprit vessel) was decided. Lesion was successfully crossed, ballooned and flow regained (the vessel was small caliber).However just after deployment of the stent (still the vessel was patent with TIMI III flow), he developed severe pulmonary edema, bradycardia and cardiac arrest (PEA). Cardiopulmonary resuscitation was done (it was interrupted with short periods of intrinsic activity) IABP was inserted and TPM was placed and the patient was intubated and mechanically ventilated, the patient revived after prolonged CPR (1.5 hours). Re-Angio revealed still patent LAD and sub totally occluded Ramus, which was patent before. PCI to Ramus was successful. Subsequent Echocardiography showed severe LV dysfunction with LVEF 10-15%. Due to continued hemodynamic deterioration, it was decided to support the patient with ECMO. VA-ECMO was inserted in left groin in the Cath Lab then the patient shifted to CCU and we could able to come down with the inotropes and the patient started to be awake and moving all limbs. In the first night the CVP was increased up to 26mm H_2O and CXR showed massive left pleural effusion so left chest drain was inserted and more than 2 liters of bloody effusion was drained after that the CVP went down to 11mm H_2O and the ABG improved but repeated CXR revealed recollection again in left pleura and Hb continued dropping despite of continuous blood transfusions so he was taken to OR for exploratory left thoracotomy which revealed big amount of blood clots and bleeding intercostal artery and fracture ribs due to CPR and external cardiac massage. After that he became stable again and Hb started to build up. After stabilization of the patient and became generally better with good ABGs, and good Hemodynamics he was taken again to the Cath Lab electively for another trial to open the RCA which was succeeded this time and RCA was opened and stented. The LAD and Ramus artery stents were found to be patent with TIMI III flow. The patient was shifted again to CCU and ECMO weaning started gradually which was successfully done in the 5th day post implantation. Echocardiography showed EF 40% after ECMO explantation.

During the course of ECMO, patient had developed severe thrombocytopenia and severe anemia as well so, clopidogrel had to be stopped, Aspirin was continued. However after 48 hours of removal of ECMO, new suddenly clinical deterioration was observed with severe cardiogenic shock again. Echocardiography showed EF-15%. A Re-look Angio showed that all the stents were occluded with huge thrombi. Extensive aspiration thrombectomy was done and hemodynamics was supported with IABP again. Unfortunately patient also developed extensive bilateral pneumonias (positive sputum for Acinetobacter boumani & Pseudomonas carnii) and a VA-ECMO was deployed again but due to septic shock this time. Patient had sepsis with prolonged protracted course. This time patient could not be weaned off ECMO despite repeated trials. On the 30th Post cardiac arrest ECMO was explanted due to clotted ECMO' oxygenator and blocked flow and unfortunately in the next day the patient was declared dead.

Conclusion

Although Primary PCI in the setting of cardiac arrest can be lifesaving, it is fraught with a higher risk of complications too, especially those related to bleeding or thrombosis. A higher risk of stent thrombosis has been reported in peri-arrest primary PCI patients. Although ECMO is appealing tool but it needs heparin which may complicate the issue of dual antiplatelet therapy (DAPT) specially if there is internal bleeding or resulted in thrombocytopenia as in our case is an example where a seemingly well doing patient deteriorated all the way to death due to diagonally opposed balance between the risk of bleeding due to DAPT + heparin (complicated by thrombocytopenia), in a patient with internal bleeding and sepsis and the risk of stent thrombosis if that therapy is withdrawn. Apparently stopping clopidogrel may have shifted to the negative balance in this case. Further studies are required to carve out the anti-platelet strategy in patients with peri-arrest primary PCI. Timing of insertion of ECMO may be crucial as if it is done before PCI in such patients (with STEMI with cardiogenic shock) may lead to a less complicated course and more fruitful outcome.

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