A Case of Inferior MI and Right Heart Failure Requiring Impella RP

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Case Presentation

A 54-year-old female with past medical history of hypertension, hyperlipidemia, coronary artery disease status post percutaneous coronary intervention (PCI) with drug eluding stent (DES) in 2021 presented with mid-sternal chest pain, upper back pain, nausea and vomiting that woke her up that morning. Six weeks ago, she had undergone a panniculectomy for weight loss with post-operative course that was complicated by wound dehiscence and bleeding requiring discontinuation of aspirin and ticagrelor. On presentation, heart rate was 66 bpm, blood pressure was 81/53 mmHg, and she was saturating 100% on room air. On physical exam, the patient had raised JVP and lungs were clear to auscultation. ECG showed normal sinus rhythm with ST elevations in leads II, III, and aVF with reciprocal changes in anterolateral leads. She was taken emergently to the cath lab where she was found to have in stent thrombosis of previously placed RCA stent. Thrombectomy and PCI with DES was performed. During the procedure, the patient went into ventricular fibrillation cardiac arrest with ROSC achieved after defibrillation. Right heart catheterization demonstrated a pulmonary artery pulsatility index (PAPI) of 0.7 and right atrial pressure of 25 mmHg. An Impella RP device was placed due to concern for right heart failure and cardiogenic shock. Transthoracic echocardiogram showed LVEF 44% with basal inferolateral, basal inferior, mid inferolateral, and mid inferior segment hypokinesis. The patient was transferred to the ICU on eptifibatide (Integrillin) and low dose epinephrine infusion. The patient was fluid resuscitated and the Impella was weaned and removed the following day. She was discharged on hospital day 7 on dual antiplatelet therapy.

Discussion

Approximately 40% of myocardial infarctions (MI) involve the inferior wall. Inferior MIs typically have a better prognosis compared to those affecting other regions such as the anterior wall. Factors that increase mortality in inferior MIs include RV infarction, hypotension, bradycardia, heart block, and cardiogenic shock. About 40% of inferior Mis involve the right ventricle such as in this case. Inferior MI is diagnosed on ECG with ST-segment elevation in leads II, III, and aVF with reciprocal ST depression in lead aVL. Addition of right-sided ECG leads can examine the RV. Clinically, RV infarction should be suspected in the context of inferior MI by the triad of raised JVP, hypotension and clear lung fields. Measurement of invasive hemodynamics can assist in diagnosing right heart failure. Pulmonary artery pulsatility index (PAPI) <1 has been validated as a predictor of in-hospital mortality and/or requirement of percutaneous RV support device. PAPI is calculated as (PA systolic- diastolic)/Right atrial pressure (RAP). Management of right heart failure includes preload optimization, maintaining perfusion, and use of mechanical circulatory support (MCS) in refractory cardiogenic shock. Impella RP is a catheter-based pump

used in right heart failure that utilizes axial flow to bypass the RV and provide up to 4 L/min of blood flow. This case demonstrates the importance of identifying inferior MI and subsequent right heart failure as well as initial management techniques and mechanical circulatory device options in cases of cardiogenic shock.