Experience with the Impella® 2.5 in a Patient with Refractory Pulmonary Edema after Myocardial Infarction

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Abstract

The Impella®2.5 is a percutaneously placed, left ventricular assist device which provides up to 2.5 liters per minute of flow from the left ventricular cavity directly into the ascending aorta. The 12 Fr. pump is mounted on the distal end of a 9 Fr. catheter and connected to a mobile console.
We report a patient undergoing temporary left ventricular support with an Impella ®2.5 for the treatment of refractory pulmonary edema and severe left ventricular dysfunction following extensive myocardial infarction ***(Iranian Heart Journal 2009; 10 (2):34-36).***

Key words: ventricular assist device ■ pulmonary edema ■ myocardial infarction

Case report

A 51-year-old man referred to our hospital with refractory pulmonary edema, frequent resting chest pain, and border-line hemodynamic status after an acute infero-postero-lateral myocardial infarction. Transthoracic echocardiography showed severe left ventricular (LV) systolic dysfunction, with LV ejection fraction of 25 to 30%, and moderate mitral regurgitation. In spite of aggressive medical therapy, he remained symptomatic and experienced several episodes of pulmonary edema. Thus, the patient was transferred to the catheterization laboratory. The coronary angiography demonstrated a total occlusive lesion of a large co-dominant left circumflex (LCX) artery in the proximal portion as the culprit artery, along with significant lesions of the mid-left anterior descending (LAD) artery (Fig. 1) and diffuse right coronary artery (RCA) disease.

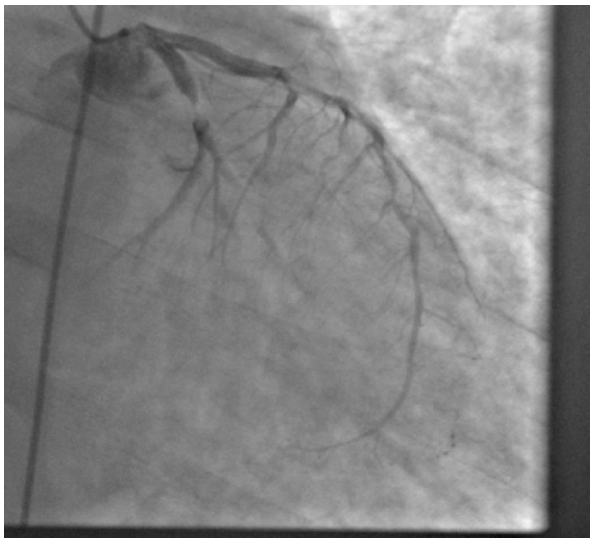

Fig. 1. Left coronary angiogram demonstrating occlusive LCX lesion.

The poor hemodynamic status of the patient prompted the decision for left ventricular assistance before any attempt for revascularization.

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the femoral artery through a 13 Fr. arterial sheath. The Impella ® 2.5 catheter (Fig. 2) allows for a cardiac output of 2.5 L/min independent of hemodynamic conditions.

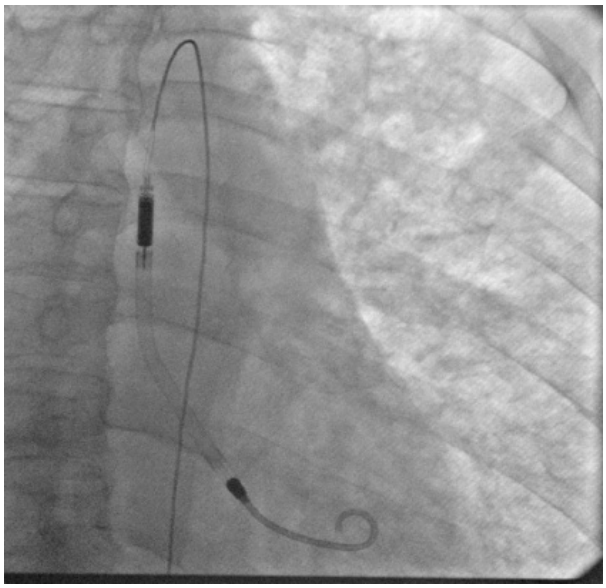

Fig. 2. View of the Impella assist device in place.

After wiring of the LCX lesion, direct stenting was performed using a 3.5×16 mm bare-metal stent, with ensuing TIMI-3 antegrade flow (Figs. 3, 4).

The patient was transferred to CCU for additional medical therapy. On day two, he was completely free of dyspnea and anginal chest pain. Echocardiography revealed LV ejection fraction of 30 to 35% and improved segmental wall motions. The Impella ® 2.5 catheter was removed on day three, and the patient was discharged on day seven without any ischemic or local vascular complications. He was advised to return for additional revascularization procedures at the near future.

Discussion

Impella devices (Abiomed Cardiovascular Inc., Danvers, MA) are minimally invasive catheter-based pumps. The system consists of an implantable pump and a mobile console.

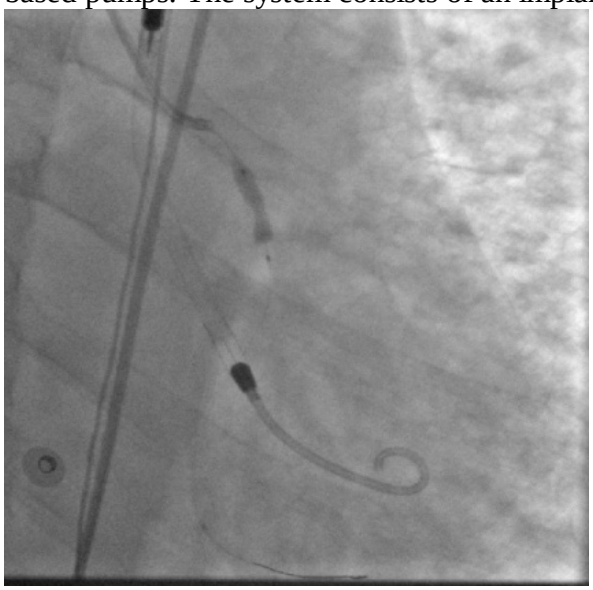

Fig. 3. Balloon dilatation of the circumflex artery lesion.

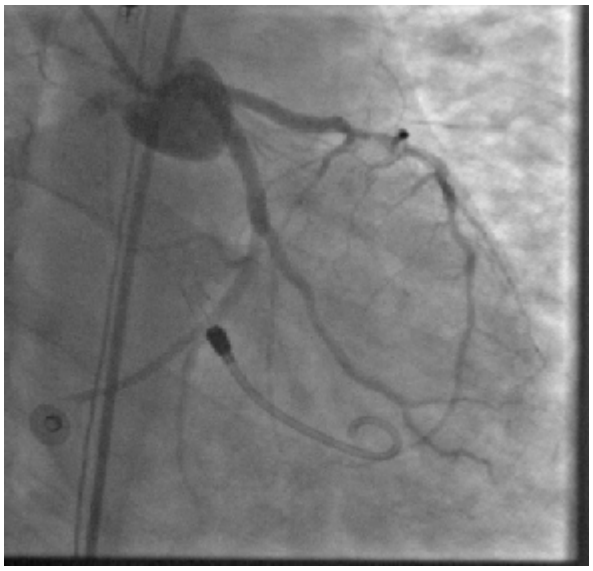

Fig. 4. TIMI-3 run-off after successful stenting.

A microaxial flow pump at the tip of the catheter placed in the left ventricle through the aortic valve propels blood through the outflow portion of the device into the ascending aorta. There are two sizes available; the one that can flow up to 5 L/min requires surgical insertion via a peripheral artery or a graft on the ascending aorta. This class of device has been shown to help postcardiotomy shock patients.[1]

The other one can be inserted percutaneously but can flow up to 2.5 L/min. Some of the indications include postcardiotomy shock patients and failure to wean from cardiopulmonary bypass machine, post-cardiac transplantation status, acute myocardial infarction and cardiogenic shock, and high-risk coronary interventions.[2-5] Our case demonstrated the feasibility of a minimally invasive LV assistance device, the Impella ® 2.5, in the context of a high-risk coronary intervention in a high-risk post-myocardial infarction patient with deteriorating hemodynamic status.

References

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