

A Case of Percutaneous Coronary Intervention for Acute Myocardial Infarction

Infarction cardiogenic shock supported by the Impella device.

BY ARTHUR GRANT, MD, FACC, FAHA, FSCAI, AND ZEHRA JAFFREY, MD

Patients presenting in cardiogenic shock have poor in-hospital outcomes despite emergent revascularization, inotropic support, and intra-aortic balloon pump implantation.¹ We report the case of a patient with acute myocardial infarction who presented in cardiogenic shock and underwent emergent left main (LM) percutaneous coronary intervention (PCI) supported by the Impella 2.5 left ventricular assist device (Abiomed, Danvers, MA).

CASE REPORT

A 71-year-old man with a history of three-vessel coronary artery bypass surgery was transferred to Ochsner Medical Center for high-risk PCI. He had a medical history of multiple vascular procedures (abdominal aortic aneurysm repair and carotid endarterectomy). He initially presented to an outside facility with non-ST segment elevation myocardial infarction. Cardiac catheterization revealed a patent left internal mammary artery graft to a small distal left anterior descending artery, a patent saphenous vein graft to the posterior descending artery, an occluded saphenous vein graft to an obtuse marginal branch, and a subtotal occlusion of the LM leading to an unrevascularized left circumflex (LCX) system (Figure 1). He was initially stable after arrival to our center on intravenous nitroglycerine and enoxaparin. However, within minutes, he reported chest pain, developed cardiogenic shock, and was taken to the cardiac catheterization laboratory for an emergent PCI.

The Impella 2.5 circulatory support device was inserted via the left common femoral artery using a 14-F

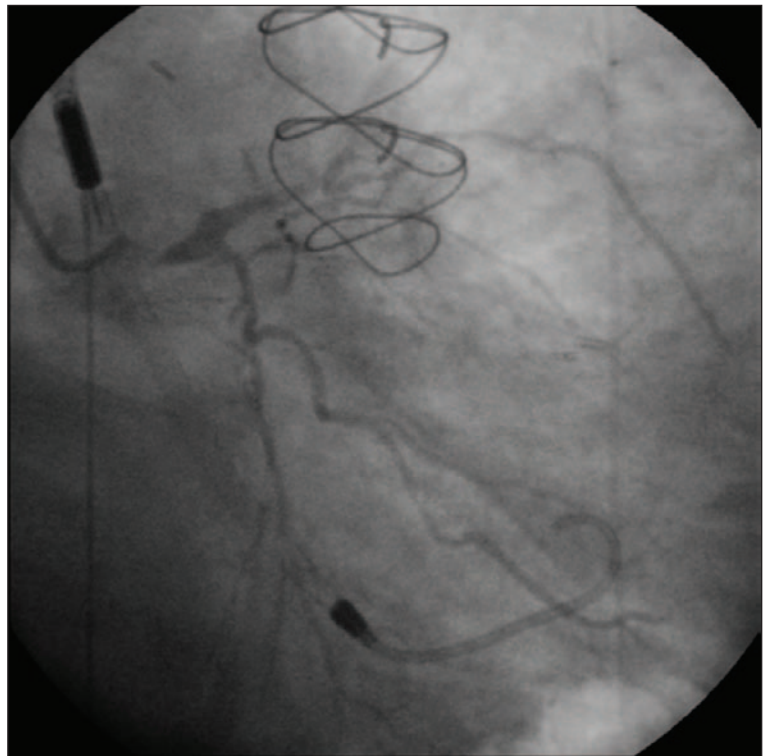


Figure 1. Subtotal occlusion of the left main.

sheath (Figure 2). A diagnostic coronary catheter was used to place the 0.018-inch wire across the aortic valve into the left ventricle. After removing the catheter, the Impella 2.5 was loaded onto the 0.018 wire and placed in the left ventricle using monorail technique.

Angiography was used to confirm appropriate positioning of the Impella 2.5 catheter with the inlet area resting in the left ventricle and the outlet area located above the aortic valve.

A 6-F JL 5 guide was inserted into the ostial LM, and a 0.014-inch wire was inserted into the LCX. A 2.5-mm X

20-mm balloon was inserted into the LM and was inflated. At this point, the patient became asystolic. The hemodynamic monitor showed the loss of a biphasic arterial waveform. Despite this, the Impella device continued to provide cardiac output, and the patient's mean blood pressure remained above 50 mm Hg. Because the patient remained awake and responsive, cardiopulmonary resuscitation was not initiated. A 5-F pacing wire was then inserted into the right ventricle and pacing was initiated. At this point, the hemodynamic monitor showed return of a biphasic arterial waveform. A 2.5-mm X 15-mm stent was inserted into the ostial LCX and a 4-mm X 15-mm stent was inserted into the proximal LM. At the end of the procedure, the patient had TIMI 3 flow in the LM and LCX system (Figure 3).

The Impella device remained in place for an additional 4 days to provide augmented coronary and end-organ perfusion after the procedure. The patient showed early signs of significant improvement hemodynamically and was weaned off all inotropic and vasopressor support within the first 24 hours. On day 5 of Impella support, the device was successfully removed without complication. The patient was discharged to home in good condition 9 days after admission.

DISCUSSION

The Impella 2.5 provided support both to successfully conduct PCI in the setting of an acute coronary syndrome and to resolve cardiogenic shock in the postinterventional period. The device maintained an adequate cardiac output during a period of asystole, allowing the patient to maintain adequate blood pressure and remain responsive through a short period of hemodynamic instability.

Similar data in the literature confirm the role of the Impella in high-risk patients who are to undergo angioplasty.^{2,3} A recently reported randomized trial also confirmed the safety and feasibility of the Impella device as compared to an intra-aortic balloon pump in patients presenting in cardiogenic shock.⁴ ■

Arthur Grant, MD, FACC, FAHA, FSCAI, is a cardiologist at Ochsner Medical Center in New Orleans, Louisiana. He has disclosed that he holds no financial interest in any product or manufacturer mentioned herein. Dr. Grant may be reached at (251) 460-0078; chipgrant@gmail.com.

Zehra Jaffrey, MD, is from the Ochsner Medical Center in New Orleans, Louisiana. He has disclosed that he holds

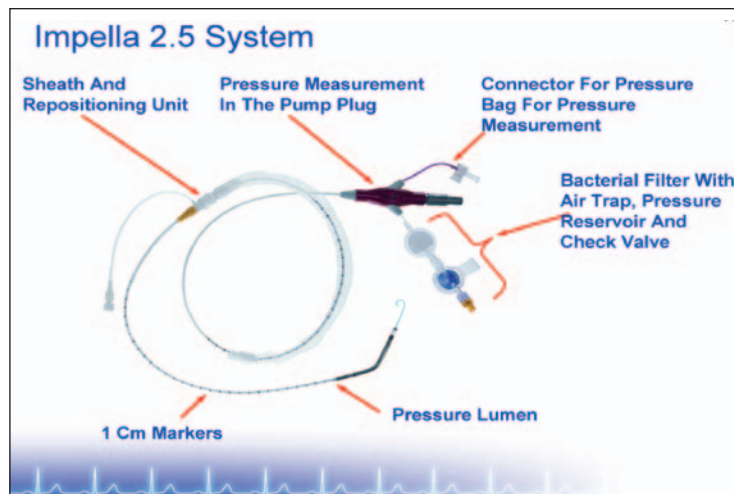


Figure 2. Components of the Impella 2.5 system.

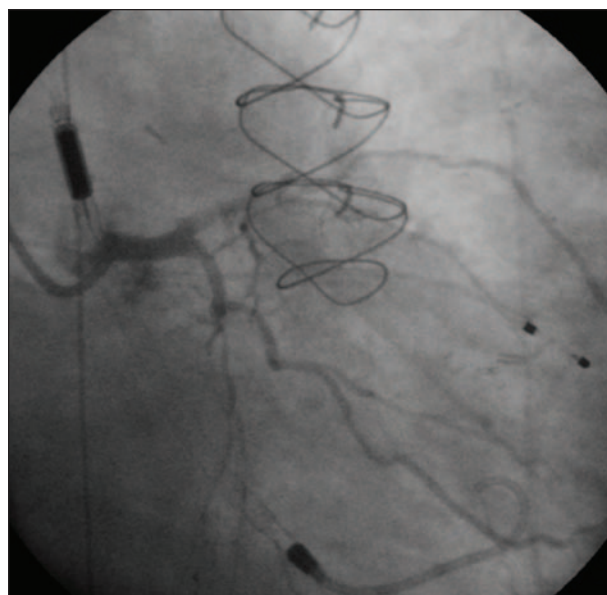


Figure 3. Postprocedure left coronary angiogram.

no financial interest in any product or manufacturer mentioned herein. Dr. Jaffrey may be reached at (504) 842-3786; zehra.jaffrey@ochsner.org.

1. Hochman JS, Sleeper LA, Godfrey E, et al. Should we emergently revascularize occluded coronaries for cardiogenic shock: an international randomized trial of emergency PTCA/CABG-trial design. The SHOCK Trial Study Group. *Am Heart J.* 1999;137:313-321.
2. Cohen R, Domniesz T, Elhadad S. High-risk left main coronary stenting supported by percutaneous Impella RECOVER LP 2.5 assist device. *J Invasive Cardiol.* 2007;19:E294-296.
3. Minden HH, Lehmann H, Meyhofer J, et al. Transradial unprotected left main coronary stenting supported by percutaneous Impella RECOVER LP 2.5 assist device. *Clin Res Cardiol.* 2006;95:301-306.
4. Seyfarth H, Sibbing D, Bauer I, et al. A randomized clinical trial to evaluate the safety and efficacy of a percutaneous left ventricular assist device versus intra-aortic balloon pumping for treatment of cardiogenic shock caused by myocardial infarction. *J Am Coll Cardiol.* 2008;52:1584-1588.