Impella 2.5™ Supported Multivessel PCI With Left Main Stenting in the Setting of NSTEMI With Severe LV Dysfunction

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KEY CLINICAL ISSUES

- Significant myocardial revascularization without complications in the setting of complex anatomic disease not amenable to CABG with angina and severe cardiac disease
- Effective use of hemodynamic support based on the following factors:
  - Patient status: advanced age
  - Complex multilesion, multivessel coronary artery disease with ongoing angina
  - Severe disease of distal left main and proximal Cx, totally occluded LAD, severe disease of the large OM branch of the Cx

A 74-year-old man presented to the emergency department with syncope preceded by chest pressure. He developed chest pressure and nausea, followed by a second syncopal episode. The discomfort continued after he regained consciousness, and he presented to the emergency room for evaluation. The patient had a history of severe coronary artery disease. He had undergone coronary artery bypass graft (CABG) procedures twice. The initial CABG in 1999 was for the left internal mammary artery (LIMA) to the left anterior descending (LAD) artery, saphenous vein graft (SVG) to the diagonal branches of the LAD artery, and SVG to the circumflex coronary artery (Cx). CABG was redone in 2007 involving an SVG jump graft to the posterior lateral branch and posterior descending artery (PDA) of the right coronary artery (RCA) for inferior wall myocardial infarction (MI) and cardiogenic shock. The redo procedure was complicated by right ventricular laceration during sternotomy.

The patient also had a history of ischemic cardiomyopathy, chronic systolic congestive heart failure without recent decompensation, long-standing type II diabetes mellitus, hypertension, and hyperlipidemia.

The initial cardiovascular workup revealed an elongated troponin I level at 0.678 ng/mL (< 0.034). The results of an EKG showed old inferior wall MI with minimal ST depression and no evidence of acute injury.

The patient was treated via non ST-segment elevation MI (NSTEMI) protocol and received clopidogrel, acetylsalicylic acid, metoprolol, atorvastatin, and insulin therapy. He was started on IV nitroglycerin, IV heparin, and IV eptifibatide. With medical therapy, the patient was completely pain free and feeling much better.

The next day, cardiac catheterization (Figures 1 and 2) showed severe disease of the distal left main and proximal Cx. The LAD was totally occluded. Right anterior oblique

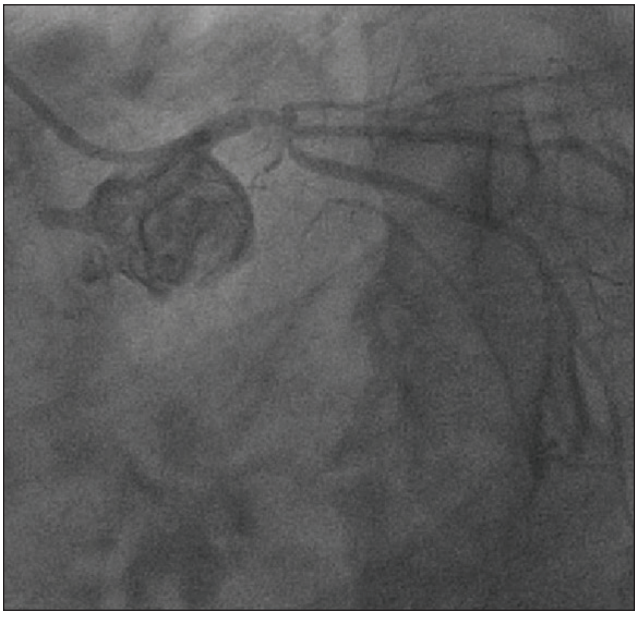

Figure 1. Severe disease of the distal left main and proximal Cx and totally occluded LAD.

Figure 2. Severe disease of large OM branch of Cx.

caudal projection showed severe disease of the large obtuse marginal (OM) branch of the Cx. There was severe distal disease of the RCA, patent SVG to the posterior lateral branch and PDA, dilated left ventricle (LV) with severe inferior wall hypokinesis, moderate hypokinesis of remaining segments, and severe LV systolic dysfunction with an ejection fraction of 30%.

The patient developed angina during the night after the diagnostic catheterization. In consultation, the cardiovascular surgery team believed that the patient was too high-risk for repeat surgery given the severe disease, severe LV dysfunction, ongoing angina, limited conduits, and history of right ventricular laceration. The findings were discussed with the patient, and the decision was made for high-risk, multivessel PCI with Impella 2.5™ system support (Abiomed, Inc.).

Figure 4. The Impella 2.5 circulatory support system catheter.

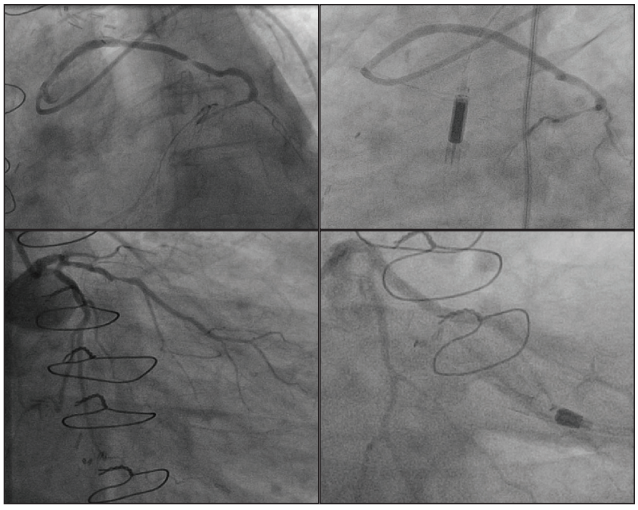

Figure 3. Final results were excellent.

PROCEDURE DESCRIPTION

Circulatory support kept the patient hemodynamically stable during a complex, multivessel revascularization procedure. Imaging of the left iliac and common femoral arteries showed tortuosity but no significant peripheral vascular disease. The Impella 2.5™ catheter was placed without difficulty via the femoral artery. Coronary stents were placed in the proximal and distal SVG lesions. A coronary stent was placed in the mid OM, and balloon dilation was performed in the LM in the ostial Cx. A coronary stent to the LM was placed into the ostial OM. The Impella catheter was weaned and removed without difficulty prior to leaving the cath lab.

PATIENT FOLLOW-UP

The patient made a full recovery and is free of chest pain. He was discharged to home in stable condition.

DISCUSSION

This was a successful Impella-supported, high-risk, multivessel PCI in the setting of NSTEMI with severe LV dysfunction (Figure 3). Despite multiple runs of nonsustained ventricular tachycardia during the case, there were no hemodynamic consequences due to Impella support.

DEVICE DESCRIPTION

The Impella 2.5™ microaxial blood pump is percutaneously placed in the LV to provide up to 2.5 liters per minute of nonpulsatile blood flow into the aorta. The pump is inserted through a 13-F sheath placed in the femoral artery,

and the 9-F catheter body is passed across the aortic valve to position the inflow port in the left ventricle, with the outflow port and axial flow pump in the ascending aorta (Figure 4). ■

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