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Staying One Step Ahead: Prophylactic Impella Placement for High-Risk CABG



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Introduction

Safely separating from cardiopulmonary bypass (CPB) is a difficult task in cardiac surgery with good reason. It is estimated that post-cardiotomy cardiogenic shock (PCCS) complicates 0.2% to 6% of cardiac operations and is associated with considerable morbidity and mortality.

Early implantation of mechanical circulatory support (MCS) devices before weaning is an attractive strategy and is supported by recent ACC guidelines for technically challenging or prolonged PCI in patients with severe LV dysfunction (EF <35%).

Perhaps this strategy should be employed for certain cardiac surgeries in select patient populations. For patients undergoing surgical intervention, early institution of MCS implantation after CPB has been shown to improve survival. However, no guidelines have been established for preemptive MCS devices for patients at high risk for PCCS. We submit a case where an Impella was implanted prior to separation from CPB in anticipation of PCCS.

Photos

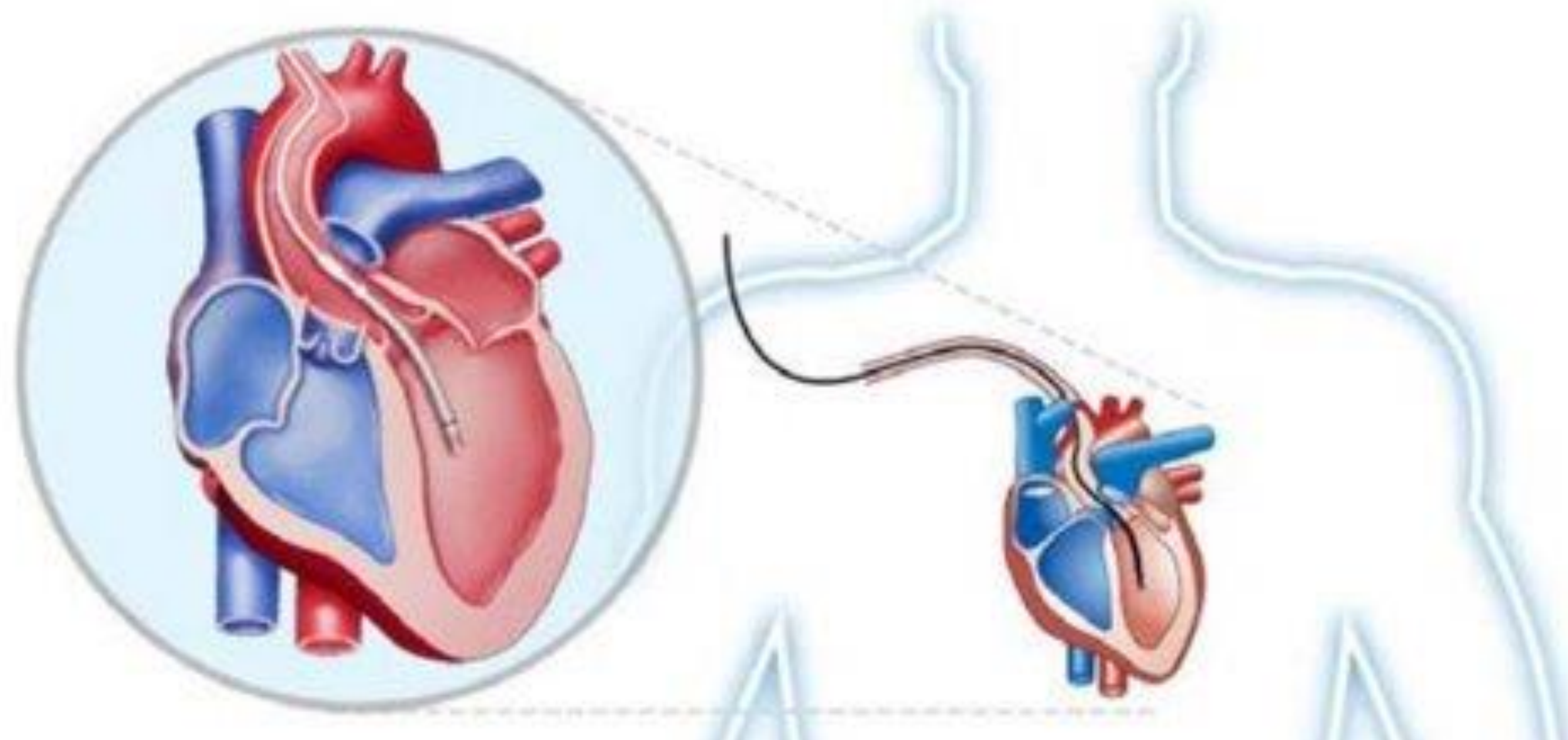


Figure 1. Illustration of an Impella device placed using a right axillary artery approach

Case Presentation

We present a 68-year-old male with a past medical history of HTN, IDDM2, CKD due to renal cell cancer s/p right nephrectomy, prior duodenal ulcers and provoked PE as well as an extensive 80 pack year smoking history. Our patient had symptomatic ICM involving 75% stenosis of the LM, 80% stenosis of the LAD, CTO of the RCA and a resultant EF of 30%.

Prior to the procedure, the decision was made by the surgical and anesthesia team to place an Impella 5.5® device prophylactically due the combination of his medical history and severity of his disease.

Patient then underwent a CABGx3 with LIMA to the LAD, RIMA to the OM1, and SVG to PDA. Prior to initiation of CPB, a 10 mm gelweave graft was placed via the right axillary artery. Intraoperative epinephrine at 2 mcg/min was required to maintain MAP prior to initiation of CPB. After removal of aortic cross clamp, TEE showed continued left ventricular dysfunction with EF of 20% and the surgeon proceeded with Impella insertion as planned. The patient was successfully weaned off CPB on Impella support of P6 at approximately 4 L/min and transferred to the ICU on 2 mcg/min of epinephrine and 1 unit/hr of vasopressin.

Patient was extubated POD1 and remained supported by the Impella on P6 delivering 4-4.2 L/min of flow. The patient's recovery course was complicated by A-Fib with RVR on POD #3 and emergently re-intubated on POD #6. On POD #8, patient returned to the OR for device removal with no issues. TTE done on POD #11 showed improvement of EF to 44%. Patient was extubated on POD #13 and discharged home on POD #22.

Main Points

- PCCS complicated 0.2% to 6% of cardiac operations and is associated with higher morbidity and mortality
- Current consensus of early implantation recommended for PCI in patients with severe left ventricular dysfunction (EF <35%)
- Timing of implementation of MCS in cardiac surgery is unclear
- "Wait-and-see" reactionary approach is often at the cost of high inotropic support, prolonged CPB time, or restricted MCS options
- The future trend may be towards earlier implementation of MCS in select populations

Discussion

MCS is a frequently used in the operating room to assist with separation from bypass as well as post-operatively in the ICU. In both settings, treatment is often reactionary and in response to low cardiac output states such as PCCS. While a "wait-and-see" approach is commonly practiced, it is often at the cost of high inotropic support, prolonged CPB time, or restricted MCS options. In patients with severely reduced ventricular function, recent trends support increasingly earlier implementation of MCS. We submit that a prophylactic Impella would be of great benefit in a carefully selected population, and should be considered.

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