Early postoperative hemodynamic monitoring in patients with a left ventricular assist device: More than just numbers

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The hemodynamic management of patients during the early postoperative period following implantation of a left ventricular assist device may be challenging as a consequence of systemic vasodilation or hypertension or right-sided circulatory failure from right ventricular dysfunction or pulmonary hypertension. Further increasing the complexity of management are the constraints of current LVAD designs that limit pump operation to a fixed speed mode causing insensitivity to preload changes compared to the native heart that prevent adequate responsiveness to changes in left ventricular filling. Additionally, LVAD systems provide limited amounts of information on pump performance (eg, reliability of flow estimates or availability of intracardiac pressures).¹

Bahatyrevich and colleagues² report on the use of continuous transesophageal echocardiography (TEE) monitoring during the early postoperative period in patients who underwent implantation of a durable LVAD and compared information obtained from the TEE evaluation to hemodynamic parameters obtained from a pulmonary artery catheter. Among 30 patients receiving continuous monitoring with TEE, 87% had at least 1 disagreement between conventional monitoring and TEE findings and 73% had at least 1 event where conventional parameters were normal and TEE findings were abnormal. Abnormal TEE findings included a shift in the interventricular septum in 63%, abnormal ventricular volume status in 73%, and right ventricular failure in 30%. Based on conventional monitoring, none of the patients required LVAD speed change, whereas 54 TEE assessments revealed the need for LVAD speed adjustment in 47%.

There are a number of important limitations in the study by Bahatyrevich and colleagues,² including a small study cohort from a single center with nonrandomized assignment of patients to receive postoperative TEE monitoring; inclusion of a survival comparison to patients not receiving TEE monitoring who likely had marked differences in risk, including a much higher preoperative use of extracorporeal membrane oxygenation in the group not receiving TEE monitoring; and lack of information on

Transesophageal echocardiogram and postoperative ventricular assist device management.

Central Message

Continuous transesophageal echocardiography assessment during the early postoperative period adds important clinical information in patients undergoing left ventricular assist device implantation.

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the efficacy and appropriateness of changes based on TEE findings.

The study by Bahatyrevich and colleagues² confirms what many of us already grapple with in the management of patients receiving a durable LVAD device: the lack of reliable and critical hemodynamic information during the postoperative period. The authors² correctly point out that hemodynamic assessment with a pulmonary artery catheter is not always reliable or accurate. Thus, the need for complementary information with TEE monitoring in the postoperative setting is intuitive and likely adds important information to the clinical management of these patients. What should not be taken from this study is the need for routine use of TEE monitoring in all patients receiving durable LVADs, as a majority of patients receiving a durable LVAD do well without additional monitoring. This study highlights the need for “intelligent” LVAD designs that provide more information to clinicians regarding system performance and hemodynamic parameters of the patient, and additionally respond more appropriately to changes in preload and afterload conditions.

References

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