Commentary: Implantable hemodynamic monitoring; a potential milestone in left ventricular assist device management.

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Commentary: Implantable hemodynamic monitoring; a potential milestone in left ventricular assist device management.

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Central Message
Implantable hemodynamic monitoring may be considered as a milestone in the management of patients supported by LVAD because may improve dramatically the prognosis of these patients.

Central Picture Legend
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Heart failure is an advanced disease with an increasing impact on patient’s quality life, and health system. These patients become increasingly frail and hemodynamically more unstable. These factors are major causes of repeat hospitalizations and impact the patient's life, by being associated with poor prognosis, poor quality of life and reduced life expectancy. In advanced and extreme conditions (INTERMACS 2 or 3), these patients no longer respond to medical therapy and are often kept hospitalized to undergo intensive medical treatment with intravenous inotropic drugs while waiting to undergo heart transplantation or left ventricular assist device (LVAD) implant. During the last decade more and more attention is being paid to the use of continuous remote implantable hemodynamic monitor (IHM) to prevent both rapid deterioration of the hemodynamics of heart failure (HF) patients and to monitor continuously the course of patients assisted with LVADs. There is an increasing interest in the use of a wireless IHM (CardioMEMS, Abbott) in these patients since the CHAMPION randomized trial (CardioMEMS Heart Sensor Allows Monitoring of Pressure to Improve Outcomes in NYHA Class III Heart Failure Patients) have demonstrated an advantage of this device in reducing significantly the rate of readmission compared to patients without device (hazard ratio: 0.63, 95% confidence interval: 0.52–0.77).\(^1\) CardioMEMS is positioned in one pulmonary artery branch during right heart catheterization and measures the pulmonary artery pressure and the filling pressures. It works according to the hypothesis that filling pressures will increase before other signs of decompensated HF occur. In addition, the usefulness of CardioMEMS is also likely to be found in patients with LVAD. A decrease in filling pressures recorded by the device is frequent in situations such as hypovolemia and hemorrhage, while an increase in filling pressures is often associated with increased pulmonary congestion (as in case of LVAD thrombosis or aortic valve insufficiency) and in case of cardiac tamponade. Moreover, patients with fixed pulmonary hypertension before LVAD implant can be carefully monitored to verify the trend of pulmonary pressure during LVAD therapy in order to consider the patient eligible for heart transplant.\(^2,3\)

Lampert and Teuteberg\(^4\) have presented a timely literature review regarding the use of CardioMEMS and the related results. The authors correctly emphasized IHM as a more accurate tool than echocardiographic evaluation in optimizing LVAD speed and in titrating diuretics and vasodilators. Based on the Lampert’s review and considering the relevant clinical utility of CardioMEMS, use of the device should be encouraged in many HF centers. We should recognize some limitations of the CardioMEMS. The high cost limits the wider use in the clinical practice. Moreover, the device can measure only the pulmonary pressure which maybe suboptimal in some scenarios such as primary pulmonary disease or increased pulmonary vascular resistance. In those scenarios, hemodynamic
parameters such as pulmonary capillary wedge pressure of left atrial pressure can assess more appropriately the hemodynamic and provide a better LVAD optimization. CardioMEMS represents a promising tool and should be considered a cornerstone in the continuous monitoring of patients with HF and those assisted with LVAD especially because it could improve their prognosis.

References


