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EDITORIAL COMMENT

The Conundrum of Rising Medicare and Medicaid Spending on Advanced Therapies for Heart Failure*

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Advances in mechanical support have dramatically changed the landscape of heart failure management. Just a few decades ago, patients who had exhausted basic medical therapies for heart failure had no options for life-sustaining therapy. In 1967, Dr. Christiaan Bernard performed the first orthotopic heart transplant (OHT) in South Africa, and since then more than 100,000 patients' lives have been extended. However, demand vastly outstrips supply for heart transplantation, and each year thousands of people die while waiting for a heart transplant (1). More recently, advances in left ventricular assist device (LVAD) therapy have offered new hope to these patients. Initially born as complex and clumsy equipment meant to be used for temporary support, LVAD technology has evolved to a portable device that has extended lives both for patients waiting for a transplant (bridge to transplant) and even as a long-term alternative for patients ineligible for heart transplantation (destination therapy) (2).

Heart transplantation and LVADs improve quality of life and survival in patients with advanced heart failure. However, despite the hope they offer, both remain expensive technologies. Although OHT has proven to be cost-effective, LVAD has not met the conventional cost-effectiveness thresholds (3). For example, in a study of Medicare beneficiaries, LVAD had an incremental cost-effectiveness ratio of $209,400 per quality-adjusted life-year and $597,400 per life-year gained compared with medical management (4). Although the field of LVAD is rapidly evolving and costs will likely come down as technology continues to improve, LVADs remain expensive solutions in the near future.

However, as a result of these costs, both OHT and LVAD can be inaccessible solutions for many patients, especially those who are most disadvantaged, such as the uninsured and those covered by Medicaid. Indeed, prior studies demonstrated that individuals who are poor, as well as racial and ethnic minorities, have less access to OHT and LVAD (5,6). Such inequality represents a fundamental failure to ensure an equitable health care system for all individuals. At the same time, growing need for these therapies can pose a significant financial burden to insurers, states, and the federal government, as well as to individuals who must cover their significant out-of-pocket expenses. To make decisions about future policies in this area, both clinical leaders and policymakers need high-quality contemporary data on use of these technologies.

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In this issue of *JACC: Heart Failure*, Patel et al. (7) begin to fill this gap with an analysis of trends in use, outcomes, and expenditures in heart transplantation and LVADs between 2009 and 2014. These investigators report increasing use of both transplantation (from 1,795 to 2,140 annually) and LVAD (from 2,205 to 3,645 annually), whereas unadjusted in-hospital mortality rates remained unchanged for OHT (4.5% to 6.6%) and were decreased for LVAD (17% to 12%). Most importantly, Patel et al. (7) found that Medicare and Medicaid contributed to more than 50% of the cost associated with OHT and LVAD hospitalizations, with an annual expenditure increase from ~$288 to $451 million for OHT and from ~$400

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to ~$800 million for LVAD between 2009 and 2014. Mean costs per index hospitalization for OHT increased more than 30% during the study period, but mean costs per index hospitalization for LVAD remained essentially unchanged. This study highlighted the crucial role Medicare and Medicaid play in providing access to these lifesaving yet high-cost technologies.

Armed with this important information, how should we move ahead? How can we reconcile the growing need for high-cost therapies with increasing cost consciousness in medicine? How should we think about disparities in the context of growing demand for technology? How can one bridge these gaps and reduce the financial burden to individuals and to society while deriving the greatest benefit?

We suggest a few potential solutions. First, we should recognize that as technology advances, costs may drop. With any new technology, it takes time for innovations to become commoditized—moving from computers the size of a football field and available only to the wealthiest corporations to computers the size of your palm and widely available, for example. Patel et al. (7) provide compelling evidence of improving clinical outcomes with stable mean index hospitalization costs for LVAD, a finding suggesting that such declines may be within reach. There may also be potential for earlier intervention with less powerful support mechanisms that could put off or eliminate the need for full mechanical support in the long run. Similarly, any new technologies that reduce bleeding and thrombosis, or that create entirely internal devices without the potential for driveline infections, may hold promise for changing the paradigm for long-term LVAD users in particular.

Second, we should continue to work to improve the care of OHT and LVAD recipients post-procedure and identify innovative ways to reduce complications and readmissions, and thus also costs. Doing so would improve the cost-effectiveness of these technologies. For example, in the cost-effectiveness study referenced earlier, if the LVAD readmission rate and outpatient care costs could be reduced by 50%, the incremental cost-effectiveness ratio would be closer to the conventional cost-effective threshold of $80,000 per quality-adjusted life-year. This is a tall order, but clinical innovations that improve post-discharge monitoring, help patients comply with complex drug regimens, and recognize the importance of social determinants of health could all also help reduce post-implant use.

Finally, as engineers continue to advance the technology and clinicians continue to advance care models, it is imperative that policymakers continue to work toward a better health care system to deliver OHT and LVADs more efficiently and equitably. For example, a prior study showed that Medicaid expansion under the Affordable Care Act was associated with increased heart transplant listings in African Americans (5), thus highlighting the importance of insurance in narrowing disparities in access to care. This may be an important area for future research. It is also worth noting that Medicaid expansion has come under intense political fire recently, and rollback of the expansion could threaten access to high-cost technologies for underserved populations nationwide. This could widen existing disparities in care and outcomes for heart failure even further.

Advances in heart failure therapy have offered lifesaving options to hundreds of thousands of patients. However, technology will not reach its full impact until we are able to reduce its cost, minimize disparity, and provide access to a wider public.

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