EDITORIAL

An Old Assist Device for a Potential New Indication in Refractory Heart Failure

Perspectiva de nueva aplicación de un viejo dispositivo de asistencia circulatoria en la insuficiencia cardíaca refractaria

ALEJANDRO BARBAGELATA MD, [FAHA, FSCAI, FICA]

Intra-aortic balloon pumps (IABPs) are commonly used for temporary mechanical support in patients with complicated, advanced heart failure (HF), the femoral access being the most common approach. (1)

Unfortunately, this approach has significant limitations for prolonged assistance due to limited mobility, deconditioning and complications as a result of extended bed rest, as is the case of the population in waiting list for heart transplantation (TX) where patients may remain weeks on circulatory support.

In the current issue, Levin et al. (2) retrospectively analyzed 38 patients undergoing transthoracic IABP implantation through subclavian artery access, instead of the usual femoral access technique.

The authors reported a median support time of 24 days (5-64) and the indication for using this access was expected prolonged support due to low or high body surface area (BSA), high panel reactive antibody (PRA), or O blood group. The study included stage D HF patients, refractory to standard treatment, requiring hospitalization and inotropes in all cases before IABP implantation. Although not specified in the article, patients in the transplantation list were in status 1A. Transplant was performed under IABP support in 73.3% of patients, and the rest were bridged to more complex support such as the CentriMag ventricular assist device.

The field of mechanical circulatory support (MCS) has made an enormous progress in the past 15 years. From the early days of mechanical support for cardiopulmonary bypass to the modern days of MCS with percutaneous temporary support or fully implantable devices, the development in this field has been remarkable. (3)

In this era of complex devices, with newer continuous flow designs used as bridge to transplantation (BTT) or even as destination therapy, Levin et al.´s report with IABP appears at first glance as scarcely innovative.

However, there are several reasons why this approach might have a role in the management of this population and eventually be extrapolated to larger advanced heart failure groups as bridge to decision or recovery.

Heart transplant is still considered the gold standard for treatment of advanced HF patients. However, donor limitations and restricted candidacy, afford a solution for only a few. There are around 2200 TX per year in the USA and that number has not changed over the years despite significant efforts and national policies. Yet, there are more than 200,000 stage D refractory patients that might benefit from it. (4)

In most patients with end-stage HF needing mechanical or chronic inotropic support, the median waiting time to TX is approximately 55 days. (5)

The use of left ventricular assist devices (LVADs) as BTT has become the standard therapeutic strategy associated with progressively fewer complications and higher rates of survival to TX, compared with chronic inotropic infusion. (6) Recent changes in the United Network for Organ Sharing (UNOS) policy directed to prioritize Status 1A or 1B for allocation of an available heart, have helped to increase the use of assist devices as bridge to TX. Today around 40% and in some USA areas up to 80% TX candidates have an assist device at the time of TX, especially continuous flow devices. This fact implies a second sternotomy within a short period of time, increasing the risk at the time of heart TX. (6,7)

Many patients who are candidates for orthotopic heart transplantation (OHT) and who require long-term mechanical support are at a relatively higher risk for LVADs based on history of a previous sternotomy, recurrent ventricular arrhythmias, dual end-organ disease requiring multi-organ transplantation and underlying elevated panel reactive antibodies.

Historically, few of these patients with relative and absolute contraindications for LVADs receive IABP for

Rev Argent Cardiol 2014;82:257-258. http://dx.doi.org/10.7775/rac.v82.i4.4787
SEE RELATED ARTICLE: Rev Argent Cardiol 2014;82:274-278 - http://dx.doi.org/10.7775/rac.v82.i4.3882

Past Associate Director of Heart Failure, Assist Devices and Transplant at University of Texas Medical Branch
[FAHA] Fellow of the American Heart Association
[FSCAI] Fellow of the Society for Cardiovascular Angiography and Interventions
[FICA] Fellow of International College of Angiology

mechanical support because of prolonged immobility due to the femoral access implant.

Levin et al.´s approach, using transthoracic IABP surgically implanted through subclavian access, in most cases admitted support as bridge to TX for several days or weeks with an acceptable safety profile, clinical improvement and comfort, as this form of mechanical support allows sitting upright and ambulation.

Transthoracic IABP support as BTT while permitting ambulation has been reported in a small number of patients using surgically placed and tunneled prosthetic or vein graft via left subclavian access. (9, 10) Recently, an easier percutaneous method was published through axillary access in 25 patients with similar success rate and safety profile. As this study had a control group with more complex devices, it also showed a significant cost-saving approach. (11)

Although continuous flow device costs have shown downtrend in the last few years, (12) this particular aspect might be critical especially in countries where the newer complex devices are the exception rather than the rule and in some cases prohibitive. Patients with refractory advanced HF may try this approach as bridge to decision or recovery and relegate complex devices to a specific subset of patients.

A well-designed larger study is mandatory to provide stronger support to this provocative approach.

Conflicts of interest

None declared

REFERENCES

1. Cheng JM, den Uil CA, Hoeks SE, van der Ent M, Jewbali LS, van Domburg RT, et al. Percutaneous left ventricular assist devices vs. intra-aortic balloon pump counter pulsation for treatment of cardiogenic shock: a meta-analysis of controlled trials. Eur Heart J. 2009;30:2102-8.http://doi.org/bh52xz

2. Levin R, Degrange M, Porcile R, Blanco N, Byrne J. Antegrade Use of Intra-aortic Balloon Pump as Bridge to Transplantation. Rev Argent Cardiol. 2014;82:274-278.

3. Peura JL, Colvin-Adams M, Francis GS, Grady KL, Hoffman TM, Jessup M. Recommendations for the Use of Mechanical Circulatory Support: Device Strategies and Patient Selection: A Scientific Statement From the American Heart Association. Circulation 2012;126:2648-67. http://doi.org/tn6

4. Miller LW. Left ventricular assist devices are underutilized. Circulation 2011;123:1552-8. http://doi.org/b97gxp

5. Singh TP, Almond CS, Taylor DO, Graham DA. Decline in heart transplant wait list mortality in the United States following broader regional sharing of donor hearts. Circ Heart Fail 2012;5:249–58. http://doi.org/fzb29v

6. Nativi JN, Drakos SG, Kucheryavaya AY, Edwards LB, Selzman CH, Taylor DO, et al. Changing outcomes in patients bridged to heart transplantation with continuous- versus pulsatile-flow ventricular assist devices: an analysis of the registry of the International Society for Heart and Lung Transplantation. J Heart Lung Transplant. 2011;30:854-61.

7. Colvin-Adams M, Valapour M, Hertz M, Heubner B, Paulson K, Dhungel V, et al. Lung and heart allocation in the United States. Am J Transplant. 2012;12:3213-34.http://doi.org/tn7

8. Cochran RP, Starkey TD, Panos AL, Kunzelman KS. Ambulatory intraaortic balloon pump use as bridge to heart transplant. Ann Thorac Surg. 2002;74:746-51.http://doi.org/bxvxx9

9. H'Doubler PB Jr., H'Doubler WZ, Bien RC, Jansen DA. A novel technique for intraaortic balloon pump placement via the left axillary artery in patients awaiting cardiac transplantation. CardiovascSurg 2000;8:463–5.http://doi.org/bqxn42

10. Russo MJ, Jeevanandam V, Stepney J, Merlo A, Johnson EM, Malyala R, et al. Intra-aortic balloon pump inserted through the subclavian artery: A minimally invasive approach to mechanical support in the ambulatory end-stage heart failure patient. J Thorac Cardiovasc Surg. 2012;144:951-5.http://doi.org/tn8

11. Estep JD, Cordero-Reyes AM, Bhimaraj A, Trachtenberg B, Khalil N, Loebe M, et al. Percutaneous placement of IABP in the left axillary/subclavian position provides safe ambulatory long term support as bridge to transplantation. JACC 2013;1:382–8.

12. Rogers JG, Bostic RR, Tong KB, Adamson R, Russo M, Slaughter MS. Cost-Effectiveness Analysis of Continuous-Flow Left Ventricular Assist Devices as Destination Therapy. Circ Heart Fail. 2012;5:10-6.http://doi.org/bqkv2s