

## Letters to the Editor

**Ventricular Support With Extracorporeal Membrane Oxygenation: A Double-edged Sword****Asistencia ventricular con oxigenador extracorpóreo de membrana: un arma de doble filo****To the Editor,**

We have read with the utmost interest the article by Merchán et al<sup>1</sup> on the use of ventricular support with extracorporeal membrane oxygenation (ECMO) in situations other than cardiogenic shock, recently published in *Revista Española de Cardiología*. We share the authors' interest and enthusiasm for the potential benefits of a technique of this type in distinct cardiology scenarios, especially in the most severely ill patients. Nevertheless, we feel obliged to offer a few comments on the subject.

In our experience,<sup>2,3</sup> ventricular support with ECMO can have a spectacular and immediate hemodynamic effect in patients with cardiogenic shock, especially in those in a very critical condition, with rapidly progressing hemodynamic deterioration despite high doses of vasopressors and inotropic agents (Interagency Registry for Mechanically Assisted Circulatory Support [INTERMACS] 1 profile). Nevertheless, most published series<sup>4</sup> show that this benefit comes at the expense of a high incidence of serious complications, leading to heavy resource use and a high mortality rate. These complications are due to the use of an extracorporeal circuit, the increase in left ventricular afterload, the need for full-dose parenteral anticoagulation, and the use of larger cannulas than would be needed with other devices. All these factors, together with the lack of randomized studies demonstrating a prognostic benefit in critically ill cardiovascular patients, leads us to consider that, at the present time, its use is justified only in the most severely ill patients for whom there are no other therapeutic alternatives. While we share the interest of Merchán et al. in the benefits of ventricular support with ECMO in other clinical scenarios, we find the use of such an aggressive technique in more stable patients to be frankly controversial. It seems difficult to justify the need for an ECMO circuit in a patient undergoing a high-risk intervention without marked hemodynamic deterioration, and even more so when there are other less aggressive therapeutic alternatives (intra-aortic balloon pump and other devices for percutaneous ventricular support<sup>5</sup>), which, despite the lack of solid evidence based on randomized, prospective studies, have shown good results. For all these reasons, we consider that the message concerning the benefits of ventricular support with

ECMO in certain situations should be conveyed with the utmost caution.

We believe that it is especially necessary to gain greater knowledge of the possible benefit of such a promising therapeutic tool in the acute cardiology patient, promoting the creation of high-quality, prospective, multicenter registries. In this regard, reports like that of Merchán et al<sup>1</sup> undoubtedly constitute a step in the right direction.

Albert Ariza-Solé,<sup>a,\*</sup> Victòria Lorente,<sup>a</sup> José Carlos Sánchez Salado,<sup>a</sup> and José González-Costello<sup>b</sup>

<sup>a</sup>Unidad de Cuidados Intensivos Cardiológicos, Hospital Universitario de Bellvitge, L'Hospitalet de Llobregat, Barcelona, Spain

<sup>b</sup>Unidad de Insuficiencia Cardíaca Avanzada y Trasplante, Hospital Universitario de Bellvitge, L'Hospitalet de Llobregat, Barcelona, Spain

\* Corresponding author:

E-mail address: [aariza@bellvitgehospital.cat](mailto:aariza@bellvitgehospital.cat) (A. Ariza-Solé).

Available online 22 November 2015

**REFERENCES**

- Merchán S, Martín-Moreiras J, Uribarri A, López J, Reta L, Sánchez PL. Asistencia ventricular con oxigenador extracorpóreo de membrana: más allá del tratamiento del shock cardiogénico. *Rev Esp Cardiol*. 2015;68:897–9.
- Ariza-Solé A, Sánchez-Salado JC, Lorente-Tordera V, González-Costello J, Miralles-Cassina A, Cequier-Fillat A. Asistencia ventricular con membrana de oxigenación extracorpórea: una nueva alternativa al rescate del shock cardiogénico refractario. *Rev Esp Cardiol*. 2013;66:501–3.
- Couto-Mallón D, Ariza-Solé A, Guerrero C, Muntané G, Dallaglio PD, Roca J. Soporte ventricular tipo ECMO como puente a ablación en shock cardiogénico refractario secundario a taquimiocardiopatía. *Med Intensiva*. 2015. <http://dx.doi.org/10.1016/j.medin.2015.03.008>.
- Zangrillo A, Landoni G, Biondi-Zoccai G, Greco M, Greco T, Frati G, et al. A meta-analysis of complications and mortality of extracorporeal membrane oxygenation. *Crit Care Resusc*. 2013;15:172–8.
- Dangas GD, Kini AS, Sharma SK, Henriques JP, Claessen BE, Dixon SR, et al. Impact of hemodynamic support with Impella 2.5 versus intra-aortic balloon pump on prognostically important clinical outcomes in patients undergoing high-risk percutaneous coronary intervention (from the PROTECT II randomized trial). *Am J Cardiol*. 2014;113:222–8.

**SEE RELATED ARTICLES:**

<http://dx.doi.org/10.1016/j.rec.2015.06.010>

<http://dx.doi.org/10.1016/j.rec.2015.12.003>

<http://dx.doi.org/10.1016/j.rec.2015.09.007>

**Ventricular Support With Extracorporeal Membrane Oxygenation: A Double-edged Sword. Response****Asistencia ventricular con oxigenador extracorpóreo de membrana: un arma de doble filo. Respuesta****To the Editor,**

Regarding the Letter to the Editor from Ariza-Solé et al, in which they offer their point of view concerning the article we published

in *Revista Española de Cardiología*,<sup>1</sup> we would like to add the following comments and reflections.

The use of a ventricular assist device with extracorporeal membrane oxygenation (VA-ECMO) for hemodynamic support in high-risk percutaneous coronary interventions and electrical storm can, as we show in our experience, be a valuable tool compared with other types of support. Intraaortic balloon counterpulsation is the oldest and simplest method, but its efficacy in patients with cardiac indices lower than 2 L/min/m<sup>2</sup> is questioned. In these cases, the next option in the range of

mechanical support measures comprises two devices: Impella® and ECMO plus VA. Percutaneous Impella® produces an increase in cardiac output of 2.5-4.0-5.0 liters and, although its cost is approximately 3-fold higher than that of VA-ECMO, the device appears to be effective for the performance of angioplasty in high-risk patients.<sup>2</sup> However, in patients in whom femoral access is not possible or those having severe aortic stenosis, which were the cases in our patients nos. 1 and 4, respectively, its use is not possible.

The implantation of VA-ECMO is considered to be an aggressive technique because of the vascular complications derived from the size of the cannulas and the hematologic complications inherent in an extracorporeal circuit. In our experience, these complications are minimized by limiting the use of VA-ECMO to the duration of the procedure, ensuring safety and hemodynamic stability when they are technically difficult, in unstable and very high-risk patients. Moreover, the possibility of providing partial circulatory support enables the use of smaller cannulas, reducing the rate of vascular complications.

Finally, we subscribe to the initiative proposed by Ariza-Solé et al concerning the creation of a high-quality, prospective, multicenter registry to gather all the available experience with the use of VA-ECMO in the different clinical scenarios associated with the cardiology patient. Once again, the idea is to extend the utilization of this strategy for circulatory support in cardiac critical care units.

## FUNDING

This study was partly funded by the European Regional Development Fund (FEDER-UE)/Instituto de Salud Carlos III (ISCIII)

and the Red de Investigación Cardiovascular (RIC) (Cardiovascular Research Network) (RD12/0042), Spain.

Soraya Merchán,\* Javier Martín-Moreiras, Aitor Uribarri, and Pedro L. Sánchez

Servicio de Cardiología, Hospital Universitario de Salamanca, Instituto de Investigación Biomédica de Salamanca (IBSAL), Salamanca, Spain

\*Corresponding author:

E-mail address: [arayamergo@gmail.com](mailto:arayamergo@gmail.com) (S. Merchán).

Available online 14 January 2016

## REFERENCES

1. Merchán S, Martín-Moreiras J, Uribarri A, López J, Reta L, Sánchez PL. Asistencia ventricular con oxigenador extracorpóreo de membrana: más allá del tratamiento del shock cardiogénico. *Rev Esp Cardiol.* 2015;68:897-9.
2. Gómez-Hospital JA, Gómez-Lara J, Ronda J, Homs S, Lozano Martínez-Luengas I, Ferreira JL, et al. Seguimiento a largo plazo tras el tratamiento percutáneo del tronco coronario izquierdo no protegido en pacientes de alto riesgo no aptos para cirugía de revascularización. *Rev Esp Cardiol.* 2012;65:530-7.

SEE RELATED ARTICLE:

<http://dx.doi.org/10.1016/j.rec.2015.09.007>

<http://dx.doi.org/10.1016/j.rec.2015.12.003>

## Thrombectomy in Primary Angioplasty: Do the Latest Large Studies Address the Doubts About Its Usefulness?



### Trombectomía en angioplastia primaria: ¿aclaran los últimos grandes estudios las dudas sobre su utilidad?

To the Editor,

We read the study by Spitzer et al<sup>1</sup> and the editorial by Moreno<sup>2</sup> about the usefulness of manual thrombectomy in primary coronary thrombectomy. There is discordance in the literature, with the TAPAS study (Thrombus Aspiration during Percutaneous Coronary Intervention in Acute Myocardial Infarction Study) and 3 meta-analyses<sup>3-5</sup> finding it advantageous, but 2 more recent large trials, TASTE (Thrombus Aspiration in ST-Elevation myocardial infarction in Scandinavia) and TOTAL (A Randomized Trial of Routine Aspiration Thrombectomy With PCI Versus PCI Alone in Patients With STEMI Undergoing Primary PCI), suggesting otherwise. Due to its results and sample size, the TASTE trial had a decisive influence on the meta-analysis of 26 trials by Spitzer et al,<sup>1</sup> comprising 60.6% of the patients included in the meta-analysis. With the addition of the 10 732 patients from the TOTAL trial, future meta-analyses will take a similar course. However, we believe that there are important aspects that must be taken into account when evaluating the influence of these trials. The TASTE trial was a multicenter, prospective, randomized trial, with patients from the Swedish Coronary Angiography and Angioplasty Registry (SCAAR), and included patients who were candidates for primary percutaneous coronary intervention. Patients gave initial verbal consent and subsequent written consent and were then randomized in a 1:1 ratio to receive primary percutaneous coronary intervention either with or without thrombus aspiration. The primary endpoint was all-cause mortality in the first month

and annually thereafter. A total of 11 709 patients attended the centers but, as Moreno pointed out,<sup>2</sup> only 7244 (60%) were randomized; the remaining 4580 were included in a parallel registry, 1138 (24.8%) of them undergoing aspiration. The reasons for exclusion were inability to give consent (38%); thrombus aspiration not possible (16%), inappropriate (11%), indicated (7%); and other reasons (28%). The 30-day mortality of the study patients was 2.8% in the thrombus aspiration group vs 3.0% in the control group and was 10.9% vs 10.5% in the 2 registry arms. Finally, although the results were concordant according to Sianos classification of thrombus burden, the study appendix provided the percentages of each study patient group, but not those of the registry. Therefore, we believe that while the TASTE trial has the strengths of being multicenter and prospective, with a very large sample, and based on a positive initiative such as the SCAAR, it also has some limitations. These include not providing the percentage of direct stent implants in each treatment arm, not having a central angiography assessment laboratory, and 2 more aspects that we judge to be of vital relevance: not providing the percentage of types of thrombus for registry patients and, equally important, having a mortality 3 times higher in the parallel registry patients than in the randomized patients.

Similarly, the TOTAL trial included 10 732 patients from 87 hospitals over 4 years of recruitment, with a mean 30.8 cases per year per center. In this study there was no parallel registry of excluded patients. The percentage of patients classified as Killip I was 95.6% in the thrombectomy group and 95.8% in the percutaneous coronary intervention group, and mortality at 180 days was only 3.1% in the thrombectomy group and 3.4% in the percutaneous coronary intervention group without thrombectomy. This information could indicate a significant selection bias.

In our opinion, it is surprising that the analysis of these studies does not mention the low mortality rates.<sup>6</sup> Therefore, we believe