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Editorial

The shock code in Spain. The next quality leap in cardiological care is here

Código *shock* en España. El próximo salto de calidad en la asistencia cardiológica ya está aquí

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Despite advances in the approach to cardiogenic shock, it continues to lead to very high hospital mortality, reaching 67% in an unselected population in Spain.[1] Unfortunately, there is little reliable scientific evidence that could help to improve the prognosis of these patients. Since the late 1990s, it has been known that early revascularization is important in patients with acute myocardial infarction (AMI) complicated by cardiogenic shock.[2] It is also known that after the initial phase of vasoconstriction in patients with low cardiac output, a situation can evolve that is characterized by systemic inflammation, vasoplegia, and multiorgan failure in which inotropes and vasoconstrictors are no longer effective. This situation may lead to death if cardiac output is not increased by the use of mechanical circulatory support (MCS).[3,4]

In this setting, the role of intra-aortic balloon pulsation as a bridge to early revascularization or a higher level of MCS seemed clear until the IABP-SHOCK II trial showed that, compared with conventional therapy, intra-aortic balloon pulsation did not reduce 30-day mortality.[5] Furthermore, other percutaneous MCS devices, such as Impella 2.5 or Impella CP (Abiomed, United States), do not appear to offer better results than conventional therapy in cardiogenic shock complicating AMI.[6] Given the uncertainty surrounding the treatment of patients with cardiogenic shock, a new 5-stage (A to E) cardiogenic shock classification scheme has recently been proposed.[7] This classification system better predicts the level of MCS required by patients: for example, cardiogenic shock stages D and E necessarily require the use of MCS with venoarterial extracorporeal membrane oxygenation or short-term mechanical ventricular assist devices such as the CentriMag system (Thoratec, United States). In principle, less severe stages can be treated with intra-aortic balloon pumps or Impella devices, with the option to subsequently change to a higher level of MCS. Currently, there are no clinical trials that have supported the use of venoarterial extracorporeal membrane oxygenation or short-term mechanical ventricular assist devices in patients with cardiogenic shock. Clinical practice guidelines recommend considering their use in patients with refractory cardiogenic shock depending on their age, comorbidities, and neurological function (class IIb, level of evidence C).[8] Therefore, MCS in patients with cardiogenic shock would appear to be a last resort in desperate situations. These recommendations are based on the many associated complications that appear as the level of MCS escalates and on the complex approach to these patients. Thus, the indication for and type of MCS applied should be guided by clinical judgment and the experience of the treating hospital.[9]

The foregoing points do not imply that MCS should not be used in patients with cardiogenic shock, but rather that they should be selected and treated by multidisciplinary teams with much experience in MCS in order to optimize resources and improve results.[3] Therefore, the next quality leap to improve the prognosis of these patients should be the establishment of a hierarchical regional organization for the management of patients with cardiogenic shock and the implementation of a cardiogenic shock code that is similar to the AMI code, which has been highly successful in Spain.[10] The key to the good performance of a shock code are consensus selection criteria and rapid contact with the multidisciplinary teams of level I hospitals, which provide the most comprehensive care and have all the resources (MCS and heart transplant) to manage advanced heart failure when it is detected in patients in cardiogenic shock. Subsequently, the team can decide by consensus if the patients need MCS, what type of MCS, and if the patient can be transferred to a level I hospital to assess MCS upon arrival or if they require MCS implantation in a level II hospital (ie, hospitals with their own cardiac catheterization laboratory and/or cardiac surgery department) or in a level III hospital (ie, without a cardiac catheterization laboratory). The cornerstone of achieving good results is the daily review of these patients by multidisciplinary teams in order to decide treatment and objectives. Such results should be similar to those demonstrated by Hernández-Pérez et al. [11] or those of a recent study reporting that the implementation of a shock code can improve the survival of patients with cardiogenic shock.[12] Recent data suggest that patients with cardiogenic shock have a better prognosis when they are treated in coronary intensive care units managed by cardiology departments.[1]

Revista Española de Cardiología recently published an article by Hernández-Peréz et al.[11] which presented the results of the first 5 years of operation of a multidisciplinary network for the care of patients with cardiogenic shock. This network was coordinated by the Puerta de Hierro University Hospital (Majadahonda, Madrid,

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Spain) and the study included 27 hospitals from 5 Spanish autonomous communities. This article is relevant as it describes a volume of activity and care results that are similar to those of other reference networks in other countries.[12–14]

The main strength of this initiative is that it is based on a project that was planned before beginning activity and that has clear inclusion criteria and well-defined standards of care. The main features of the care protocol include the following: a multidisciplinary team comprising cardiologists (ie, heart failure experts, acute care experts, interventional specialists), intensivists, anesthesiologists, and cardiac surgeons permanently availability in level I centers; effective collaboration with level II and III hospitals, including the possibility of the joint review of treatment and travel for patient assessment and initiation of the MCS in situ before transfer, if needed; and the daily scheduling of a shared clinical session for the clinical follow-up of active cases.

The definition of restrictive inclusion criteria (ie, refractory cardiogenic shock and/or candidacy for heart transplant or permanent ventricular assist device) led to the selection of a target population with particular clinical characteristics that differed from those of populations in other series addressing cardiogenic shock using less restrictive inclusion criteria. On the one hand, the preferential inclusion of young individuals with little comorbidity reflects the intention to aim the therapeutic effort toward patients who a priori have a better chance of survival. However, this selection bias does not imply that the treated population was at low risk. In fact, the severity of the clinical status of the patients included in the care protocol is indicated by the relatively high proportion of conditions with a poor prognosis (eg, postcardiotomy shock), the high prevalence of multiorgan failure, and the frequent indication for invasive life support measures (eg MCS). Therefore, the 1-year survival rate of 53% reported by the authors can be considered a generally satisfactory result, given that it is highly probable that the vast majority of the patients would have immediately died had they not had been treated using a specialized therapeutic approach.

Of note is the frequent indication for urgent heart transplant, which correlates with a relatively low incidence of myocardial recovery and, therefore, reinforces the fact that the patients included in the care protocol were in a severe clinical condition. The immediate results after urgent heart transplant reported by the authors are excellent and are relatively better than those reported across Spain in a slightly earlier time period.[15] The probable basis for these successful results is the rigorous selection of recipients, the timing of the heart transplants, and appropriate perioperative follow-up.

The results of multidisciplinary care networks for patients with cardiogenic shock, such as those presented in Hernández-Peréz et al.,[11] can serve to support their implementation in the Spanish health care systems that follow the AMI code. However, there are several differences between AMI and cardiogenic shock such that generalizations may not be so simple. Firstly, it is significantly more complex to identify patients with cardiogenic shock than patients with ST-segment elevation acute coronary syndrome (STEACS), in which a simple and accessible test, such as an electrocardiogram, is enough to set off alarms. Except in the setting of AMI, the symptoms of cardiogenic shock can be nonspecific; for example, patients can present with low cardiac output, which can be symptomatic of other conditions. In the case of AMI, percutaneous revascularization is a cost-effective approach to improving the prognosis of infarction patients.[10] There are few situations in which it is contraindicated and for this reason it has even been extended to elderly patients and patients with significant comorbidities. In the case of cardiogenic shock, care is needed in selecting candidates for advanced therapies, which implies that the selection criteria must not only be well defined but must also be known in all hospitals regardless of their level of care. Secondly, because the initial treatment of STEACS is relatively simple in most patients, a protocol can be implemented that facilitates adherence. However, in cardiogenic shock, the treatment provided depends on the patients' status and on the treatments available at the hospital where they were initially treated, which represents another difficulty. Finally, in general, it is more complex to transfer patients with cardiogenic shock between hospitals than it is to transfer patients with uncomplicated STEACS.

These difficulties are not insurmountable, but they require a high degree of consensus and coordination between the health care teams involved in the care of patients with cardiogenic shock. The support of all the health authorities is needed achieve this aim. In summary, if we aspire to care excellence with quality and equity criteria for patients with cardiogenic shock regardless of where they present, it is essential that there is fluid communication between all the actors, such that patients with cardiogenic shock are rapidly identified, care at different hospital levels is protocolized, and access to care is guaranteed by a multidisciplinary expert team in a cardiac intensive care unit.

CONFLICTS OF INTEREST

None declared.

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