Ivabradine as an Atrioventricular Node Modulator. Promise or Reality? Response

Ivabradina como modulador del nódulo auriculoventricular. ¿Promesa o realidad? Respuesta

To the Editor,

First, we would like thank Dr Álvarez-Acosta et al. for their comments, which we will try to address here.

In accordance with the relevant guidelines,[1] we routinely implant cardiac resynchronization devices to treat heart failure in optimally treated and nondecompensated patients. Our patient[2] was stable at the time of implantation and his heart rate, although controlled, was insufficient to guarantee an adequate pacing percentage. Nevertheless, simply implanting a resynchronization device in a patient with heart failure rarely confers a clinical improvement in subsequent weeks if the biventricular pacing percentage is only about 70%. It would be as incredible as a drug left untouched by a patient in a bedside drawer exerting a clinically relevant effect. Because we can rule out an "inherent improvement" from a resynchronization device unable to achieve adequate pacing and there were no changes in any other treatment between the 2 consecutive revisions, we must delve into the eventual role of ivabradine in our patient's heart rate control.

The criteria of causation include temporality, biological plausibility (there is a high-density If current in the atrioventricular node), analogy (ivabradine reduces heart rate during atrial fibrillation in animals), and experiment (ivabradine decreased heart rate in atrial fibrillation vs placebo in a human trial). If the pacing percentage were to decrease after ivabradine withdrawal, our hypothesis would be strengthened but such an approach would be ethically questionable. The possible effects of ivabradine on heart rate are in no way ruled out by the publications on ivabradine, which make no mention of this mechanism of action. However, it is not necessary to turn to rare genetic mutations to explain the inhibitory effect of ivabradine on node conduction because the United States prescribing information for this drug states that first-degree atrioventricular block is a frequent adverse reaction.

We would also like to take this opportunity to report that the same effect on percentage of pacing was seen in another patient administered ivabradine in the same clinical setting.

Promises can become reality if we are proactive in the search for therapeutic options by not only researching new molecules, but also by exploring new indications for existing ones.

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Implantation of Ventricular Assist Devices in Hypertrophic Cardiomyopathy. Is It a Safe Option?

Implante de dispositivo de asistencia ventricular en miocardiopatía hipertrófica. ¿Es una opción segura?

To the Editor,

We read with great interest the article published in *Revista Española de Cardiología* by Varela-Falcón et al.[1] about their experience of a left ventricular assist device (LVAD) in a patient with hypertrophic cardiomyopathy. We would like to raise a number of points for consideration in relation to this article.

First, we would like to congratulate the authors for the good outcome in this case, given the challenge it presented. In the last decade, LVADs have become a standard treatment option for improving survival and quality of life in patients with dilated cardiomyopathy and advanced heart failure, whether as a bridge to transplant or as a destination therapy[2]; however, there is little experience of this therapy in patients with cardiomyopathy and restrictive physiology, and it is not without complications.[3]

The article described a patient with hypertrophic obstructive cardiomyopathy in an advanced stage of heart failure, but did not provide details on the patient's left ventricular function before implantation. Nor did it explain why surgical myectomy was not performed, given the high dynamic left ventricular outflow tract gradient that was reported. An improvement in this gradient could have reduced the wedge pressures and improved the transpulmonary gradient.

One of the main complications during follow-up of patients with cardiomyopathy associated with apical hypertrabeculation are suction events and the increased incidence of thrombotic and embolic events. The authors state that in this case they decided not to perform surgical resection of the trabeculae due to the risk of incomplete resection. However, in our experience, incomplete resection of apical trabeculae increases the likelihood of suction events and thrombosis, particularly in hypertrabeculated ventricles, and careful examination of the ventricular cavity is recommended, putting the patient on bypass if necessary.[4]

We would also like to comment on the difficulty of inotropic treatment when initiating LVAD support and in the immediate postoperative period in these cases. In most centers, the usual

practice during LVAD implantation is vasoactive support with adrenaline and milrinone to reduce the probability of right heart failure, as the authors mention. However, in this case, by not performing a myectomy despite the dynamic left ventricular outflow gradient, they may have created the ideal environment for suction events. The vasoactive support could have increased the left ventricular outflow tract gradient and also created a high intraventricular gradient due to the increased midventricular inotropy facilitated by the adrenaline, together with the suction created by the LVAD. Considering these factors, despite the good outcome described, we believe that the performance of myectomy during implantation could help to improve the postoperative treatment of patients with obstructive left ventricular outflow tract gradients.

We would like to add that long-term ventricular assistance in cardiomyopathies with restrictive physiology is a challenge. The most important determining factor when considering LVAD implantation in these patients is probably the dimensions of the cardiac chambers. Grupper et al.[3] reported the largest published series of patients with cardiomyopathy, restrictive physiology, and LVADs, and observed that patients with smaller ventricles had a worse prognosis. In such patients, it is generally very difficult to achieve adequate ventricular assistance because they are very sensitive to volumetric changes and they are prone to suction events with postural changes. This often means that the revolutions of the device have to be reduced to avoid the cavity collapsing, and this, in turn, increases the risk of pump thrombosis and/or embolic events. Therefore, careful anticoagulant and antiplatelet therapy is required in these patients.

Last, we would like to congratulate the authors once more on the good outcome they achieved, although in our opinion LVAD therapy in cardiomyopathy with restrictive physiology is not free from significant complications and should be reserved for centers with a high annual caseload.

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Implantation of Ventricular Assist Devices in Hypertrophic Cardiomyopathy. Is It a Safe Option? Response

Implante de dispositivo de asistencia ventricular en miocardiopatía hipertrófica. ¿Es una opción segura? Respuesta

To the Editor,

We have read with interest the response of Uribarri et al. to our report.[1] The patient had severe left ventricular dysfunction. This patient was evaluated and not considered a good candidate for septal myectomy, which would not improve his severe systolic impairment and adverse remodeling. Severe systolic impairment is a rare complication in patients with hypertrophic cardiomyopathy that has a poor prognosis[2]; this situation would not be improved by performing an isolated myectomy.

All surgical considerations described by Uribarri et al. were also evaluated by our team, as well as the opinion of international surgeons with hundreds of implants. As reported, we performed an intraoperative examination of the left ventricle, when the patient was on pump, which included visual and digital examination of the cavity, in addition to the preoperative analysis of transthoratic and transesophageal echocardiograms. There was enough space after the coring without any possibility that the inflow caused any suction of the trabecules, if the pump was correctly positioned. We considered performing a myectomy during the implantation and decided that the risks outweighed the potential benefits. Although inotropes could theoretically increase the outflow tract gradient, this would be a minor complication at short term, because the effects would be the same as those of a closed aortic valve. We did not see any midventricular gradient; probably as the result of the good selection of a patient with enough cavity. We would like to point out that adding more procedures to device implantation leads to a longer time on cardiopulmonary bypass, which is a well-known independent risk factor for postoperative mortality, morbidity, and right heart failure in cardiac surgery[3]; therefore, additional procedures in this case would have increased surgical risk with an unclear clinical benefit. The anatomical variability of these patients makes an individual case evaluation mandatory and general messages not useful.

We agree that ventricular assist devices in patients with restrictive physiology should be performed in high-volume centers; at this moment in Spain there are no hospitals that meet these criteria but we have patients who need treatment. The rarity and complexity of a patient like the one we present make "safe options" difficult to find. What this patient needed was an option