Head-up Tilt Test in Vasovagal Syncope: For which Purposes? For whom?

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Vasovagal syncope is a disorder that has been known for years since its clinical characteristics were masterfully described by Sir Thomas Lewis at the beginning of the 20th century.[1] Traditionally, the criteria used to establish the diagnosis of a vasovagal origin in patients with syncopal episodes was based only on the presence of triggering circumstances and typical prodromic symptoms.

In 1986, Kenny et al[2] published an article in which they proposed the use of the tilt-table test (TTT) as a diagnostic tool to establish vasovagal origin in patients with syncope of unknown cause. After this publication, interest in the condition increased considerably and the number of publications dealing with vasovagal syncope and the TTT increased spectacularly. Fifteen years after this first publication, it is interesting to critically review what the TTT has contributed to our knowledge of the vasovagal syncope, as well as its limitations.

TTT can be considered an experimental model that makes it possible to induce, in a relatively controlled way, vasovagal responses in susceptible patients. This has made it possible to better understand various aspects of the pathophysiological mechanisms involved in vasovagal syncope, such as the behavior of the vascular tree, changes in volemia, myocardial contractility disorders preceding the episode, variations in cathecholamine secretion, and modifications in the variability of heart rate or sympathetic traffic, among others. Likewise, by observing the behavior of the heart rate and blood pressure during TTT, different patterns have been characterized, which has allowed vasovagal responses to be classified.[3] Therefore, the use of TTT has undoubtedly contributed in an important way to improving our knowledge of the pathophysiological mechanisms and clinical characterization of vasovagal syncope.

However, the use of TTT as a diagnostic tool has some limitations. The first of them is related to the fact that it has not been possible to establish a uniform protocol. As a consequence, a large variety of protocols exist,[4] making it difficult to compare results between different series. Another problem resides in the difficulty of establishing the diagnostic reliability of the test, because it is essential to first know its specificity and sensitivity. The specificity of most protocols has been established easily by analyzing the rate of positive responses in healthy persons without a history of syncope and it has been found to be relatively high. However, the sensitivity is not known because no «gold standard» exists against which test results can be compared. Therefore, the presence of a positive response to TTT in patients without heart disease and with a normal ECG, or in patients with heart disease in which a cardiogenic cause of the syncopal episodes has been reasonably excluded, can be considered diagnostic of a vasovagal origin. This has made it possible to diagnose vasovagal syncope in patients with abrupt syncopal episodes in the absence of any apparent trigger. Nevertheless, the absence of a positive response to TTT, especially in patients without heart disease and with a normal ECG, does not allow a vasovagal cause to be excluded.

Although various studies have tried to evaluate if TTT could be used as a predictor of the recurrence or severity of syncopal episodes, no variable related with the test has been found to be capable of predicting the evolution during follow-up. Sheldon et al[5] analyzed a series of variables including both clinical and TTT data, and found that only the combination of the number of previous syncopes and the duration of the syncopal history was predictive of recurrences during follow-up. Likewise, Malik et al[6] reported that the presence of a new syncopal episode in the first month after TTT was also predictive of recurrence. In all the

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series it was found that the prognosis for the survival of patients with vasovagal syncope is excellent, regardless of the result of TTT. For this reason TTT cannot be considered to contribute useful information to predicting the evolution of these patients.

Recently, the results of the ISSUE study have corroborated these findings in the subgroup of patients without heart disease and with a normal baseline ECG and, therefore, with a low probability of presenting cardiogenic syncope.[7] In this study, a Holter device was implanted in patients with a positive response as well as in patients with a negative response to TTT. During follow-up, the behavior of both groups was identical with respect to the number of recurrences and the electrocardiographic findings during syncopal episodes. It is also noteworthy that the number of patients in which an important cardioinhibition was registered during the spontaneous syncopal episode was very high (approximately 50%). This finding was observed not only in patients who presented a cardioinhibitor response to TTT, but also in those who had a vasodepressor response, and in patients with a negative TTT. Likewise, it was observed that after a mean follow-up of 10 months, only one patient suffered trauma, which occurred during a syncopal episode without cardioinhibition, and there was no death. These findings confirm the limitations of TTT in the prognostic stratification of patients with syncopal episodes of unknown origin, since it was not capable of predicting either the mechanism of action or the evolution of syncopal recurrences in this series.

Most of these data have been obtained from studies of adults; nevertheless, it must be emphasized that vasovagal syncope occurs with an especially high incidence in the pediatric population. In addition, due to the characteristics of this population, syncopal episodes in children usually cause anxiety, especially among family members. For this reason, it is important to have specific data on the characteristics and prognosis of vasovagal syncopal episodes in the pediatric population in order to establish a strategy in which only tests that contribute useful information for diagnostic, therapeutic, and prognostic management are made. This avoids performing unnecessary tests that cause more anxiety and overload the healthcare system, thus generating more costs.

The article by Díaz et al,[8] that appears in the present number of the REVISTA ESPAÑOLA DE CARDIOLOGÍA contributes specific information on the evolution of vasovagal syncope in the pediatric population. In it, the authors study the clinical and TTT variables that can have predictive value for the intermediate-term evolution in a pediatric population in which the cardiogenic origin of syncope has been excluded. The findings are similar to information available on adult populations, confirming on the one hand that the mid-term prognosis is good and, on the other hand, that the only clinical variable of prognostic values was the number of previous episodes. No variable related with TTT had predictive value for follow-up. Before TTT was carried out, the authors determined whether the patients had a high, medium, or low probability of presenting a vasovagal syncope on the basis of clinical characteristics, according to which, 66% of the patients had a high probability.

Based on these findings, the authors suggest that patients with a single previous syncopal episode, 32% of this series, should not undergo TTT because such patients did not present recurrences during follow-up. On the contrary, they suggest that TTT could be useful in patients with a larger number of previous syncopes, either to confirm the diagnosis or to identify patients with severe and recurrent episodes and a cardioinhibitor response to TTT, who could benefit from permanent cardiac pacing.

As has been confirmed for the adult population and is confirmed in this study for the pediatric population, TTT is a tool that, although limited, is eminently diagnostic. However, it has not been demonstrated that it has value for establishing the prognosis or selecting treatment. Consequently, recommendations to perform TTT should be based only on its role as a diagnostic tool in patients with syncope of unknown cause. For this reason, it is possible that TTT should not be performed in patients with a high probability, according to clinical criteria, of suffering vasovagal syncope, especially if it is a pediatric population in which a cardiogenic cause has been excluded. TTT should be reserved for patients in whom the diagnosis of a vasovagal cause is dubious.

On the other hand, one must be cautious about discussing the indication for cardiac pacing in pediatric patients with vasovagal syncope. In the first place, as the authors recognize, because the data available in the literature have been obtained in adults so it is difficult to extrapolate it to a pediatric population. In children, vasovagal syncope is a benign condition that is relatively frequent and the syncopal history often remits when they reach the adult age. In addition, aside from having limited value in the identification of patients who present severe cardioinhibition during spontaneous episodes, Tercedor et al[9] have demonstrated that TTT in the pediatric population elicits a greater rate of cardioinhibitor responses than in adults. This could lead to overestimating potential pacemaker candidates if the response to TTT is used for this purpose.

For these reasons, the data in the literature and those contributed by the article of Díaz et al allow it to be affirmed that syncope in pediatric patients without heart disease and with a normal ECG is a benign condition. As in the adult population, the clinical findings with regard to the characteristics of the syncopal episodes and previous number of

episodes usually suffice to establish the correct diagnosis and prognostic assessment in most patients. TTT should be reserved for patients with recurrent syncopal episodes that are not very suggestive of vasovagal origin clinically, after excluding other causes. In these patients, although a positive response allows a vasovagal cause to be diagnosed, the presence of a negative response does not allow the diagnosis of vasovagal syncope to be excluded.

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