

Accurate assessment of autonomic imbalance in heart failure

We read an exciting study entitled 'Evaluation of patients with autonomic imbalance in heart failure: A preliminary study of the pupillomotor function' by Keivanidou et al. [1] in one of the current issues. The authors observed an alteration in the pupillomotor functions in patients with heart failure (HF) compared to normal subjects, and they suggested these changes might reflect the activation of the autonomic nervous system (ANS).

ANS activation occurs as compensatory at the beginning. But later on, it is the main reason underlying many detrimental pathophysiological processes in HF. HF is associated with an overactivation in the sympathetic nervous system (SNS), as well as a lack of parasympathetic nervous system control [2].

Accurate assessment of autonomic imbalance has been a hotly debated topic in HF. Several parameters obtained in Holter ECG are relevant in discussing ANS. Heart rate variability has been commonly used. A standard deviation of NN intervals, value below 50 ms in the time domain analysis, and a decreased very low and low frequency band in the frequency domain analysis have been shown to indicate an increase in SNS activation. Moreover, the QT/RR slope is considered also to have a value. Heart rate turbulence is another method based on a biphasic reaction of sinus node after ventricular extrasystole. Turbulence onset ≥ 0 and turbulence slope ≤ 2.5 ms/RR is considered to be pathological [3]. Furthermore, the baroreflex function can be used to evaluate the ANS [4].

In addition, plasma norepinephrine level may provide a more direct assessment, but this can be influenced by many factors. Cardiac metaiodobenzylguanidine labeled with 123iodine (123I-MIBG) imaging is considered to give more objective data concerning the ANS. In this imaging, early and late heart-to-mediastinum ratios, and myocardial washout rate are obtained. A late heart-to-mediastinum ratio above 1.8 is considered to be physiological. A washout rate of more than 35% is accepted as abnormal. Microneurography is another method recording sympathetic nerve activity with microelectrodes from the vascular structures of skin or peripheral muscles [2, 5, 6].

A relationship between all parameters reflecting the activation of ANS and the prognosis of HF has been clearly shown in many studies. Although treatment is planned on the basis of an assumption of an overactivation in the SNS, there is no need to show it before treatment planning. In fact, a simple and reliable test showing autonomic imbalance needs to be used even for treatment planning. It would also encourage clinicians to use this kind of test as part of their routine more often. We think the present study noteworthy in terms of this aspect.

In conclusion, it is a preliminary study showing a change in the pupillomotor function in HF [1]. The relationship between these changes and autonomic imbalance should be confirmed by a more objective test (such as 123I-MIBG imaging). Having been confirmed, this test will not be limited only to HF, but may be used in other cardiovascular diseases. We would like to congratulate Keivanidou et al. for their intelligent study.

References

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