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State-of-the-art syncope assessment

Aspects & challenges - Approaches & tools



Dr. Jürgen Fortin

CEO
CNSystems
Austria

fortin@cnsystems.com

cnsystems.com

Head-up-tilt testing (HUTT) and autonomic function testing are essential diagnostic procedures in syncope assessment. With the advent of unique innovative methods to non-invasively monitor beat-to-beat blood pressure, cardiac output, total peripheral resistance as well as autonomic regulation, highly efficient tools to assess cardiovascular and autonomic function have become state-of-the-art for improved diagnosis of patients.

Over the last few decades experts around the world continue to explore the mechanisms of syncope describing different approaches, concepts and factors that might explain what is going on in a fainting patient. Although being a common disease the pathophysiology of syncope is still a rich research topic¹ and its “diagnosis and management remain challenging tasks in medical practice.”²

While the approach to diagnose syncope is most often the same for pediatric, adult and geriatric patients¹, it is meanwhile well-known that the circulatory adjustment to the stress of a postural change varies markedly over age.²

Recent studies show that considering the full set of continuous cardiovascular parameters is required to enhance the diagnosis and provide age-tailored therapies for syncope:

Wijnen et al.⁴ showed that hemodynamic responses are age-related and that the course of syncope definitely differs between young and old patients.

Gonzales-Hermosillo et al.⁷ studied young patients in order to compare the hemodynamic and autonomic responses of healthy volunteers with syncope patients during head-up tilt, analyzing heart rate variability and beat-to-beat blood pressure.

Nevertheless, in recent literature the head-up tilt test has been considered a long-term procedure with limited specificity and sensitivity³ to detect all the different mechanisms which are responsible for syncope. There is a claim for “new, more advanced methods for syncope analysis”³ that help to better understand the “complex responses provoked by the HUTT.”³ The authors agree that additional or different approaches and methods might be required.^{1,2,7,8}

“REAL IMPROVEMENT OF THE DIAGNOSIS AND TREATMENT OF SYNCOPE IS ONLY POSSIBLE BY TAKING INTO ACCOUNT THE COMPLETE SET OF ASPECTS INCLUDING THE WIDEST POSSIBLE VARIETY OF HEMODYNAMIC PARAMETERS”

Wu et al. investigated the clinical relevance of carotid sinus hypersensitivity as a possible approach and predictor of syncope and autonomic dysfunctions.²

Ruska et al. from the Zagreb Medical University evaluated the COMPASS-31 questionnaire as a supplementary method for HUTT for objective testing of the autonomic nervous system. This method proved “a valuable screening tool to assess symptoms of autonomic dysfunctions as it is associated with impaired ANS.”⁸

Apart from the evaluation of linear patterns, such as hemodynamic and autonomic parameters, approaches describing the underlying dynamics of cardiovascular responses to syncope might be required.

Makowiec et al. have investigated the so-called multistructure index (MI) describing the asymmetric

features of cardiovascular interactions. Differences have been found in the organization of the homeostatic state between healthy people and vasovagal patients.”¹

Buszko et al. from the Medical Universities in Warsaw studied vasovagal syndrome occurrence and proposed another nonlinear approach based on differences in sample entropy and even stroke volume as “measures of irregularity.”⁷

Most studies claim a need for further investigations and suppose that it might finally be a combination of many approaches which has the potential to fully elucidate the complex physiological mechanisms of syncope and which could become the gold standard.

However, real improvement of the diagnosis and treatment is only possible by taking into account the complete set of aspects including the widest possible variety of hemodynamic parameters.

The Task Force® Monitor by CNSystems has proven as commonly used diagnostic tool for the assessment of neuro-cardiogenic syncope⁸ which “calculates and registers biological signals in a completely reliable and non-invasive way, in the beat-to-beat mode, this being its main advantage.”⁹

It is an easy to use tool for currently applied protocols and allows for recording and exporting a full set of hemodynamic and autonomic parameters, which is a solid basis for further research studies. ■



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