Different hemodynamic patterns in head-up tilt test in 400 pediatric cases with unexplained syncope

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Introduction

Tilt test has been used since the 1990s, in patients with the suspicion of unexplained syncope and vasovagal syncope. In general, the indication of the test was the patients with the suspicion of reflex syncope but whose diagnosis could not be verified with the initial assessment. Tilt test is a guide for the initiation of medical treatment by evaluating the patient’s reflex syncope susceptibility. The purpose of this study is to assessment different hemodynamic patterns in head-up tilt test in 400 pediatric cases with unexplained syncope.

Methods

Head up tilt test was performed 400 pediatric patients with unexplained syncope. According to their different hemodynamic patterns in head-up tilt test, subjects were divided into orthostatic intolerance (OI) response pattern, postural orthostatic tachycardia syndrome (POTS) response pattern, orthostatic hypotension (OH) response pattern, asymptomatic orthostatic hypotension (AOH) response pattern, vasovagal (VVS) response pattern, and normal response (NR) pattern. Vasovagal response pattern was consisted of vasodepressor (type 3), cardioinhibitory (type 2A, type 2B), and mixed (type 1) pattern. Age, sex, baseline heart rate, baseline blood pressure, duration of symptoms, and number of syncope were recorded in all groups. Within the first 5 minutes that tilt table was at upright position, observation of > 40 beats / min increase in heart rate and orthostatic intolerance symptoms (dizziness, obscuration of vision) in the case was described as pediatric OI. Pediatric POTS was describes as in addition to pediatric OI criteria, measuring of the heart rate, at age of 13 and under the age of 13 as >120 beats / min and at age of 14 and over 14 years of age as 130 beats / min, within the first 5 minutes that tilt table was at upright position.

Head-up tilt test protocol:
The patients tested were prohibited to use of drug which can affect the autonomic nervous system for at least 5 days in advance. Test was perfomed after hunger lasted for at least 4 hours, at a dimly lit and quiet, temperature-controlled room. Electrocardiogram and blood pressure of each patient were measured by Dash 2000 Monitor automatically. Tilt test was performed in the form of a 10-minute stand at an angle of 70 degrees upright position of the tilt table after the rest phase at the supine position at least 25 minutes.

Results

The ages of 400 pediatric patient included in the study were in a range from 5 to 18 years (mean 12.6 ±2.6 years). Two hundered sixty four (66%)were females and 136 (34 %)male. Two hundered seventy seven (65%)of subjects displayed the hemodynamic pattern of NR, 28 (%) OI response, 22 (%) POTS response, 7 (%) OH response, 28(%) AOH response, and 38(%) VVS response. Vasovagal response pattern was consisted of 9(%) type 3 response, 10 (%)Tip 2A response, 2 (%)Tip 2B response, and 17(%) mixed (type 1) response. The most frequently abnormal monitored hemodynamic patterns were Orthostatic intolerance syndromes (OI,POTS,AOI). After that there was VVS. There were no statistically significant differences between the groups with regard to age, gender, baseline heart rate, baseline blood pressure, and duration of symptoms (p>0.05). The syncopal attacks of the children with VVS reponse group was significantly more frequent than that of the children with OI, POTS, and AOI (p <0.01)

Conclusions

We observed nine different hemodynamic patterns in head-up tilt test in 400 pediatric cases with unexplained syncope. The most frequently abnormal monitored hemodynamic patterns were Orthostatic intolerance syndromes (OI,POTS,AOI). After that there was VVS. The syncopal attacks of the children with VVS reponse group was significantly more frequent than that of the children with OI, POTS, and AOI.