EVALUATION OF ORTHOSTATIC HYPOTENSION BY USING HUTT

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ABSTRACT

Objective: To determine the prevalence of orthostatic hypotension in our patient population by using Head Up Tilt Test (HUTT).

***Study Design*:** Descriptive cross-sectional study.

***Place and Duration of Study*:** Armed Forces Institute of Cardiology & National institute of heart diseases, from Jan 2019 to Jan 2020.

Methodology: Head Up Tilt Test registry was used as a data collection tool which consisted of gender, age, symptoms, number of episodes, results, baseline blood pressure systolic, baseline blood pressure diastolic, mean blood pressure, baseline heart rate. All patients from age 20-80 undergoing Head Up Tilt Test examination were included while patients already diagnosed with orthostatic hypotension, vasovagal syncope, and cardiac myopathy were excluded from the study.

Results: Total 1587 individuals were enrolled in study, I1216 (76.6%) were males and 371 (23.4%) were females. The mean age of the study population was 45.63 ± 19 years. The results determined 67.6 (4.2%) were negative, 7(0.4%) had Vasodepressive Response of vasovagal reflex, 1435 (90.4%) had positive type 1; while 1 (0.1%) had positive type 2; and 4 (0.3%) had positive type 3; 62 (3.9%) had mixed vasovagal reflex, 1 (0.1%) had late orthostatic response and 10 (0.6%) had orthostatic hypotension.

Conclusion: Tilt-table testing is an effective method to diagnose orthostatic hypotension.

Keywords: HUTT, Orthostatic hypotension, Syncope, Vasovagal reflex.

INTRODUCTION

Orthostatic hypotension (OH) is defined as a reduction in systolic blood pressure (BP) of at least 20 mm Hg or 10 mm Hg reduction in diastolic BP upon standing or during a head up tilt test to at least 60° [1]. OH is highly prevalent in the community, but due to diverse clinical presentations, it is often unrecognized until late in the clinical course[2]. It is associated with significant morbidity and loss of autonomy in the elderly. OH is associated with an increased risk of falls, heart failure, renal failure, stroke, atrial fibrillation, hospitalization, and death[2].

The 3 common variants are: Classical OH, delayed OH, and initial OH[3]. Classical OH is characterised by a sustained reduction of at least 20 mm Hg of systolic BP or 10 mm Hg of diastolic BP within 3 minutes of standing or tilt-table testing. In delayed OH there is a sustained reduction in BP which occurs after 3 minutes of standing or upright tilt. Initial OH is defined by a transient reduction in BP (defined as a reduction ≥40 mm Hg systolic BP and/or ≥20 mm Hg diastolic BP) within 15 seconds of standing[3].

Both vasovagal syncope and delayed OH, though different disorders, cause blood pressure falls and syncope. The key distinguishing feature is rate of blood pressure fall. In vasovagal syncope, tilt table testing shows a sudden fall in blood pressure, usually with bradycardia and prodromal symptoms. This blood pressure fall may occur several minutes after upright tilting of the table, whereas in neurogenic OH the blood pressure falls almost immediately upon upright tilting. Delayed OH is typically associated with a slow gradual reduction in blood pressure, analogous to a ball rolling down a slope. In addition

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in vasovagal syncope, there is a fall in heart rate which accompanies the BP fall, whereas in delayed OH, there is typically no decrease in heart rate[4].

Tilt table testing may demonstrate the reproduction of vasovagal syncope in a controlled, laboratory setting. Positive responses in patients with neurally mediated syncope are 61-69% and specificity is high (92-94%)[5]. The most commonly used protocol includes initially tilting the table to 70°, a passive non-medicated phase of 20 minutes, administration of 300-400 micrograms of sublingual nitroglycerine after the 20th minute, followed by an additional 20 minutes of standing[5].

The main indication for tilt testing is the confirmation of a diagnosis of vasovagal syncope in patients in whom it has been suspected from the initial history. This typically includes cases involving unexplained syncope in a high-risk setting or multiple recurrent episodes when a cardiovascular cause has been excluded. Tilt testing is also performed to demonstrate susceptibility to vasovagal syncope[5].

Other tilt-table testing indications include distinguishing between reflex syncope and orthostatic hypotension or falls; and also transient loss of consciousness due to epilepsy or psychiatric problems[5].

METHODOLOGY

A descriptive cross-sectional study was conducted at Electrophysiology department of Armed Forces Institute of Cardiology & National institute of heart diseases for a period of one year from January 2019 to January 2020. Prior to data collection approval from the Institutional Ethical Review Board was taken. Head up Tilt Test registry was used as a data collection tool which consisted of gender, age, symptoms, number of episodes, results, baseline BP systolic, baseline BP diastolic, mean BP, baseline HR. Total 1587 individuals were enrolled in the study through non-probability consecutive sampling technique after satisfying the inclusion criteria which was all patients from age 20 to 80 undergoing HUTT examination while excluding patients already diagnosed with orthostatic hypotension, patients already diagnosed with vasovagal syncope. Patients suffering from any cardiac myopathy were excluded from the study. Descriptive statistics was run to calculate Frequency/percentage, Mean ± SD as variables are quantitative.

RESULTS

Total 1587 individuals were enrolled in study. One thousand two hundred and sixteen (76.6%) were Males and 371 (23.4%) were Females. The mean age of the study population was 45.63 ± 19. The results of the tilt test depicted 67.6 (4.2%) were negative, 7 (0.4%) had Vasodepressive Response of vasovagal reflex, 1435 (90.4%) had positive type 1; a mixed vasovagal response while 1 (0.1%) had positive type 2; cardioinhibitory vasovagal response and 4 (0.3%) had positive type 3; vasodepressor vasovagal response, 62 (3.9%) have mixed vasovagal reflex, 1 (0.1%)

Table-I: Demographic characteristics of the study population.

Variables	Mean ± SD/n(%)
Gender	
Males	1216 (76.6%)
Females	371 (23.4%)
Age	45.63 ± 19.67
Symptoms	
Syncope	919 (57.9%)
Fitness & categorization	11 (0.7%)
Determine Arrythmia	24 (1.5%)
Conduction Abnormalities	45 (2.8%)
Find any Pauses	1 (0.1%)
Weakness while prolong standing	11 (0.7%)
Sinus Tachy	1 (0.1%)
Blackout	35 (2.2%)
Dizziness	247 (15.6%)
Palpitation	16 (1%)
VPC	1 (0.1%)
Dizziness & Blackout	276 (17.4%)
No. of Episodes	
1 Time	542 (34.2%)
2-5 times	501 (31.6%)
6-10 times	37 (2.3%)
Many times	157 (9.9%)
OFF and ON	182 (11.5%)
Often	85 (5.45%)
Sometimes	1 (0.1%)

had late orthostatic response and 10 (0.6%) had orthostatic hypotension. The base line BP systolic was 136.83 ± 16.951, the base line BP diastolic was 81.99 ± 20.99.The Mean BP recorded was 95.98 ± 14.924 and the baseline HR was 71.65 ± 14.084.

Table-II: Results of Head Up Tilt Test.

	n (%)
Results	67 (4.2%)
Negative	7 (0.4%)
Vasodepressive response of vasovagal reflex	
Positive Type 1	1435 (90.4%)
Positive Type 2	1 (0.1%)
Positive Type 3	4 (0.3%)
Mixed vasovagal reflex	62 (3.9%)
Late orthostatic response	1 (0.1%)
Orthostatic hypotension	10 (0.6%)
Baseline BP systolic	136.83 ± 16.951
Baseline BP Diastolic	81.99 ± 20.99
BP Mean	95.98 ± 14.924
HR Baseline	71.65 ± 14.084

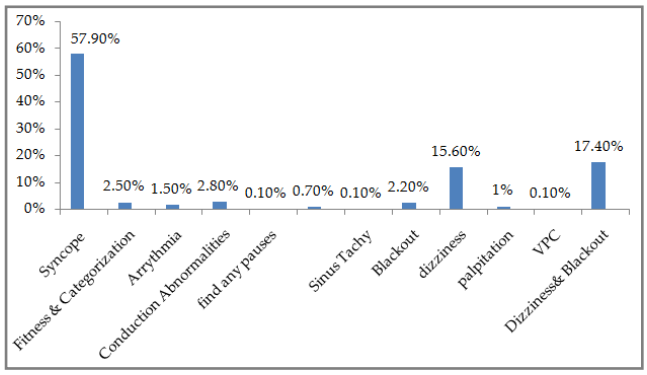

Figure: Symptoms of the study population.

DISCUSSION

The data revealed that an overwhelming majority of the patients who underwent tilt-table testing revealed a positive response for vasovagal syncope (95.1%). Only 0.6% of the patients were diagnosed with orthostatic hypotension. At initial perusal this may seem surprising given the suspected prevalence of OH in the community-the ARIC (Atherosclerosis Risk In Communities) study, a community-based prospective cohort of 15,792 middle-aged adults 45-64 years of age, showed that OH was present in 5% of individuals[7-11].

One possible explanation may be that in the Armed Forces Institute of Cardiology, where the study was carried out, many soldiers specifically with clinical presentations highly typical of vasovagal syncope are referred for tilt-table testing. This may have skewed the positive results in favour of vasovagal syncope. The population for this study had a mean age of 45, significantly lower than the ARIC study, which can also be accounted for by the number of soldiers that underwent tilt testing. OH is less prevalent in younger populations[12-18], and this may explain the lower than expected frequency of OH diagnosis in the study population.

Another possible explanation for the low prevalence of OH in the study population may be that very few patients with OH are being referred for tilt-testing because they are being diagnosed using other clinical tests such as the Active Standing Test[2]. Once diagnosed in this manner there is no further diagnostic benefit accrued by undergoing a tilt-table test, which has been showed to be less sensitive than the Active Standing Test[2].

It is also possible that OH is being underdetected using tilt-table testing[19-21]. There is considerable overlap between the clinical presentations in vasovagal syncope and OH, and syncope may be a feature of either. The pattern of fall in BP and change in heart rate is one way of discriminating between the two conditions but sometimes even then it may be difficult to give a definitive diagnosis[4].

Once diagnosed with OH, treatment is geared towards relief of symptoms rather than correcting orthostatic hypotension. Asymptomatic OH is common and of uncertain clinical relevance. Symptomatic OH management addresses modifiable contributing factors (anemia, drugs, dehydration), and employs initially non-pharmacologic strategies, and, if required, pharmacologic therapy. Orthostatic stresses vary with circumstances during the day, and so it is essential to have a patient-oriented approach emphasizing education and non-pharmacologic strategies to minimize orthostatic stress[6,18-21].

CONCLUSION

Tilt-table testing is an effective method to diagnose orthostatic hypotension.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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