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Evaluation of Cases of Syncope with Head- Up Tilt Test (HUTT)

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Abstract

Background: Autonomic dysfunction can be evaluated by using a tilt table to stand a patient at 70 degree for 45 minutes. HUTT has gained widespread acceptance as the preferred approach for evaluating cases of Reflex (neutrally mediated) syncope and can be performed safely on an OPD basis. In our study we have used HUTT for evaluating 79 patients of recurrent or single syncope with normal ECG,ECHO, Holter study, EEG and MRI brain. **Subjects and Methods:** This study was conducted at OPD basis at a single centre. In our study we have used HUTT for evaluating the patients of single or recurrent syncope in a high risk patient who have normal ECG, ECHO, Holter study, EEG and MRI brain. End point of the test was to observe the symptom of giddiness/nausea/vomiting/diaphoresis/flushing. **Results:** Total number of patients enrolled in the study group in last 09 years (from June 2009 to May 2018) was 79. In our study, the male patients outnumbered the females patients (63 vs 16 i.e.80% vs 20%). The age group 21 – 30 years constituted around 29% (23 patients) of the total syncope patients followed by 20% (16 patients) in the age group of 31-40 years. Age of the youngest and the oldest patient in the study group was 09 years and 82 years respectively. Among the patients, 36 were positive to HUTT and 43 were negative. **Conclusion:** This study conclude that HUTT is an important diagnostic tool in vasovagal syncope though the predictive value of HUTT is not 100%.

Keywords: Head-up tilt test (HUTT), Syncope, Hypo perfusion

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Introduction

Syncope is defined as a transient, self-limited loss of consciousness with an inability to maintain postural tone that is followed by spontaneous recovery occuring as a consequence of global cerebral hypoperfusion.[1] Cessation of cerebral perfusion for few seconds leads to reduction of glucose supply to brain parenchyma resulting syncope. Although many etiologies for syncope are recognised, categoristion into cardiac (cardiovascular), reflex (neurally mediated), orthostatic, and situational syncope may be helpful during the initial evaluation.

Cardiac syncope may be due to vascular disease, cardiomyopathy, arrythmia, or valvular dysfunction. Cardiac syncope is associated with increased mortality, whereas noncardiac syncope is not.

Reflex (neurally mediated) syncope may be due to vasovagal syncope, which is mediated by emotional distress such as fear of physical pain. Vasovagal syncope is the most common cause of syncope and it represents about 10-40% of all the causes.[2]

Situational syncope describes syncope that occurs with a fixed event such as micturition, deglutition, exercise induced, and carotid sinus syncope.

Syncope comprises part of a subset of clinical conditions in which loss of consciousness is transient; other conditions in this group, which are not syncope and should be clearly distinguished from syncope for example, seizure disorders, post traumatic loss of consciousness and cataplexy.[3]

History and physical examination are the most specific and sensitive ways of evaluating syncope. However, the head-up tilt test (HUTT) is the most efficacious test in studying the vasovagal reaction.

Syncope is a transient loss of consciousness and postural tone with spontaneous recovery and no neurological sequelae.[4] Syncope is a common clinical problem that affects up to 3.5% of the general population. In 40% of cases presented with syncope the exact cause remains elusive. Approximately 30% of affected patients experience recurrent episodes.[5]

Subjects and Methods

This is a retrospective study of evaluation of patients of Syncope with the help of HUTT at OPD basis at a single

center.

In our study we have used HUTT for evaluating the patients of single or recurrent syncope in a high risk patient who have normal ECG, ECHO, Holter study, EEG and MRI brain. End point of the test was to observe the symptom of giddiness/nausea/vomiting/diaphoresis/flushing. Other end points were presyncope/syncope/seizure/decrease in systolic BP more than 30mmHg/abrupt decrease in heart rate less than 40/min or asystole.

HUTT was done using automated tilt table. After a 10 min horizontal position a smooth and rapid tilt at 70 degree was achieved and maintained for 30min or till the end point is achieved. HR and BP were recorded every 2-3 min. Patients were subjected to Inj Isoproterenol infusion or sublingual Nitroglycerine (NTG) spray as a part II of the test for provocation. Dosage of Isoproterenol/NTG were titrated to achieve rise of HR by 25% or till max. dose of the drug and the patients were closely monitored for bradycardia (HR<40/min) and/ or hypotension (SBP<90mmHg) or syncope/presyncope or other problem.

VASIS (Vasovagal Syncope International Study) classification of interpreting HUTT results:

1. Type 1 mixed response: HR falls during syncope, but HR does not fall <40BPM. Or falls to <40 BPM without asystole of <3 sec. BP falls before HR falls
2. Type 2A response: Cardioinhibition without asystole, HR ↓<40 BPM for >10sec but asystole > 3 sec does not occur. BP falls before HR↓
3. Type 2B response: Cardioinhibition with asystole, Asystole >3 sec. fall in BP coincide with or occurs after HR↓
4. Type 3 response: BP falls without significant fall in HR
5. Excessive HR: Increase in HR >130 BPM followed by Postural Orthostatic Tachycardia Syndrome (POTS)

Results

Table 1: Gender-wise distribution in total cases

Gender	No. of cases	Percentage
Male	63	79.7%
Female	16	20.3%
Total	79	100%

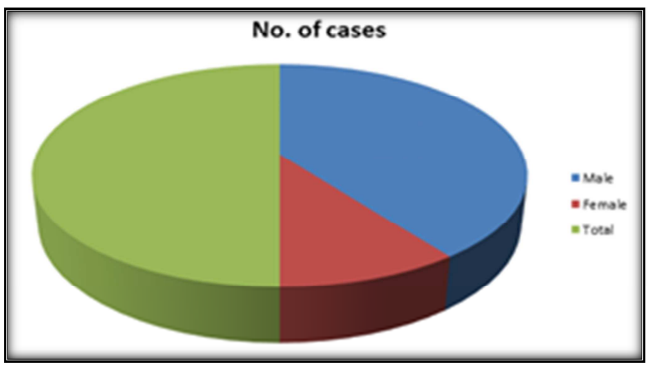

Figure 1: This chart showed gender-wise distribution in total cases

Total number of patients enrolled in the study group in last 09 years (from June 2009 to May 2018) was 79. In our study, the male patients outnumbered the females patients (63 vs 16 i.e.80% vs 20%). The age group 21 – 30 years constituted around 29% (23 patients) of the total syncope patients followed by 20% (16 patients) in the age group of 31-40 years. Age of the youngest and the oldest patient in the study group was 09 years and 82 years respectively. Among the patients, 36 were positive to HUTT and 43 were negative.

The result was positive in 36 patients (45% patients). 17 patients among the positive results group achieved the positive response with provocation with Isoproterenol/NTG only. The positive results were higher in males vs females (28 vs 08). Out of positive results, 31 patients (86% patients) had Type 1 response; 03 patients (08% patients) had Type 3 response and 02 patient (05% patients) had Type 2B response to HUTT. A significant number of patients (31 patients i.e. 86% patients) had a mixed response (i.e. hypotension before bradycardia with HR< 40 BPM).

Table 2: Age-wise distribution in total cases

Age	No. of cases	Percentage
<20	19	24%
21-30	23	29.1%
31-40	16	20.2%
>40	21	26.5%
Total	79	100%

Table 3: Distribution of cases according to HUTT

HUTT	No. of cases	Percentage
Positive	36	45.6%
Negative	43	54.4%
Total	79	100%

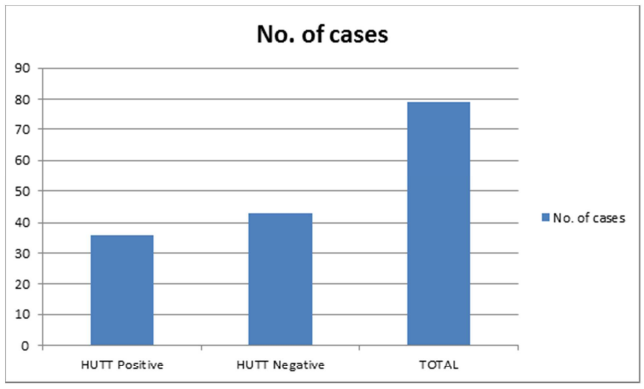

Figure 2: This chart showed distribution of cases according to HUTT

Table 4: Gender wise distribution in HUTT positive cases

Gender of positive cases	No. of cases	Percentage
Male	28	77.8%
Female	8	22.2%
Total	36	100%

Table 5: Type of response in HUTT positive cases

Response	No. of cases	Percentage
Type I	31	86.2%
Type II	2	5.6%
Type III	3	8.4%
Total	36	100%

Discussion

Syncope is defined as a transient, self-limited loss of consciousness with an inability to maintain postural tone that is followed by spontaneous recovery occurring as a consequence of global cerebral hypo perfusion. Syncope is categorised into cardiac (cardiovascular), reflex (neurally mediated), orthostatic and situational syncope.

Cardiac syncope may be due to vascular disease, cardiomyopathy, arrhythmia, or valvular dysfunction. Cardiac syncope is associated with increased mortality, whereas noncardiac syncope is not. Mortality due to cardiac syncope can be up to 33% at 01 year in patients with a cardiac aetiology.[6]

Reflex (neurally mediated) syncope may be due to vasovagal syncope, which is mediated by emotional distress such as fear of physical pain. Vasovagal syncope is the most common cause of syncope and it represents about 10-40% of all the causes.

Situational syncope describes syncope that occurs with a fixed event such as micturition, deglutition, exercise induced, and carotid sinus syncope.

Syncope should be clearly distinguished from other similar conditions like seizure disorders, post traumatic loss of consciousness and cataplexy.

History, physical examination and 12 leads ECG recordings are the most specific and sensitive ways of evaluating syncope. Lack of gold standard investigations, varied differential diagnosis and paroxysmal nature of syncope make the diagnosis difficult and costly. However, the patients of reflex (neurally mediated) syncope can be efficiently evaluated with the help of head- up tilt testing (HUTT). Head up tilt testing is a widely accepted tool in the investigation of syncope, particularly where there is no evidence of structural heart disease.[7]

Head- up tilt-table test (HUTT):

Autonomic dysfunction can be evaluated by using a tilt table to stand a patient at 70 degree for 30-45 minutes. A fall in BP and heart rate may produce a positive result in HUTT over a period of time in cases of vasovagal/neurogenic syncope. HUTT has gained widespread acceptance as the preferred approach for evaluating cases of syncope and can be performed safely on an OPD basis. However, the tilt test has a higher sensitivity in young female patients.[8] HUTT is not superior to electrophysiological stress testing, and a negative result does not exclude the diagnosis of neurogenic syncope. This study clearly indicates that syncope patients presenting to hospitals can quickly, safely and efficiently be evaluated with the help of HUTT on an OPD basis and be offered the required treatment.

Conclusion

Syncope is a common clinical presentation in emergency department. In most of the patients the cause of syncope could not be established. HUTT is an important diagnostic tool in vasovagal syncope though the predictive value of HUTT is not 100%.

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