A Cross Sectional Study on Prevalence and Etiology of Syncope in Tehran

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Abstract- Recurrent syncope of obscure etiology, particularly in those with structural heart diseases, is associated with higher mortality rates. There are insufficient and conflicting data on prevalence and etiology of syncope in the urban Middle Eastern population. Evaluating the etiologic basis of syncope can be an effective step in prevention of morbidities and sudden cardiac death in susceptible populations. The aim of our study was to determine the prevalence and etiology of syncope in an outpatient cardiology clinic in Tehran the capital of Iran. In this cross sectional study data was collected from patients' records whose first visits were from March 2006 to September 2007 and had undergone thorough examination for syncope (ECG, Holter monitoring, echocardiography, Tilt table testing, Electrophysiological study). All efforts were done to determine underlying heart diseases, physical exam and test abnormalities, final diagnosis and treatment in all selected patients. Overall prevalence of syncope was estimated to be 9%. The age-specific prevalence rates were 5-14 years: 4.14%, 15-44 years: 44.8%, 45-64 years: 31%, 65 years and Older: 20%. The most frequently identified cause (60%) was neurally-mediated (vasovagal) syncope. Mean age of patients was 44.9 years with a minimum of 5 years and maximum of 85 years. In our study, coronary heart disease had a high prevalence among participants (12.4%). Syncope is a common clinical problem. In this study prevalence rates peaked in 15-44 years age group. Considering that recurrent syncope is often disabling and may cause injury and the fact that heart diseases are more common in people affected by syncope, especial cautions should be taken while evaluating this group of patients.

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Keywords: Cardiac Syncope; Prevalence; Syncope; Syncope etiology

Introduction

Syncope by definition is a sudden transient loss of consciousness and postural tone and as a rule is accompanied by rapid and complete recovery. Loss of consciousness is due to transient decrease of blood flow to the Reticular Activating System (RAS) or global cerebral hypoperfusion, and its reversal normally does not require medical or electrical interventions. Presyncope is defined as a feeling of dizziness and lightheadedness without loss of consciousness. (1,2) Brain's metabolism is totally dependent on uninterrupted blood flow, and even momentary halt of effective circulation leads to significant alterations in mental status within approximately 10 seconds. Almost 50% of women and 25% of men experience syncope at least once in their lifetime. One to three percent of emergency department visits and two to six percent of hospitalizations are reportedly related to syncope. (3) Syncope is a prevalent problem with high diagnostic and hospitalization expenses. Since there always is a possibility for hazardous underlying conditions, costly evaluations are inevitable. Recurrent episodes of syncope are generally debilitating and may lead to physical and emotional problems. Cardiovascular syncope is associated with increased morbidity and mortality (1) and a high risk of cardiac arrest (24%). In fact syncope might be an early manifestation of

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imminent sudden cardiac death. (1, 2) Unfortunately despite many efforts the cause remains obscure on many occasions which might not always translate to a benign outcome. Intrinsic heart disease and inducible ventricular tachyarrhythmias during electrophysiological studies have been shown in patients without an obvious cause for syncope in whom a high rate of life threatening ventricular arrhythmias treated with appropriate shocks was discovered after receiving an implantable cardioverter defibrillator(ICD)as a preventive measure(4,5). In Patients receiving implantable loop recorders, cardiac arrhythmias seem to be the most prevalent etiology of syncope (6).In this study; we carefully evaluated the prevalence of specific etiologies for syncope after the culmination of diagnostic procedures in an equipped cardiology clinic to help determine the relevant clinical approach and decision making once affected individuals are faced in common practice. A holistic insight to different etiologies might further assist in prevention of upcoming events and complications.

Materials and Methods

Medical records of 1611 patients presenting to an outpatient cardiology clinic in years 2006 and 2007 were reviewed and all patients in whom definite syncope had been diagnosed by credible clinical and laboratory tests were identified and included in the study. 145 people fulfilled the inclusion criteria. Patients were grouped according to specific etiologies. Syncope prevalence in specific age groups was determined according to WHO (World Health Organization) classification. To establish the etiology, data obtained by history, physical examination, ECG, echocardiography, holter monitoring, event recorders, Procainamide challenge test, Tilt table testing, electrophysiology studies and exercise test were taken into account. Prevalence of coronary artery disease and associated risk factors including hyperlipidemia, hypertension and diabetes were noted. Data were compared and analyzed using SPSS® for windows software (version 15.0.0).

Results

From a total of 145 patients assessed, 80 were male (55%) and 65 (44.8%) were female. Mean age of patients was 44.9 years with youngest being 5 years old and eldest 85. Eighty seven people had at least one true syncopal episode, 37 presyncope and 21 had both syncope and presyncope. Twelve (8.7%) had only one episode, whereas others had multiple episodes. Twenty (13.8%) had hypertension, five (4.4%) diabetes mellitus, 11(7.6%) history of coronary artery disease, 7(4.8%) had a history of CABGs, 4(2.8%) valvular heart disease, 9 (6%) left ventricular systolic dysfunction, 14 (9.6%) hyperlipidemia, 1 (0.7%), hypertrophic cardiomyopathy, 1 (0.7%) congenital atrioventricular block and 4(2.8%) hypothyroidism. Overall syncope prevalence was 9%. Tilt table testing was performed in 110 people and was positive in 88 of cases (60%). Test results consisted of a cardioinhibitory response in 25%, vasodepressor in 18%, mixed type in 56%. Positive Tilt table testing responses were either passive or induced after receiving nitrate or isoproterenol preparations. In 32.5%, some specific cardiac disorder was diagnosed as outlined in Table 1. ECG abnormalities were present in about 29% of patients (Table 3).

Table 1. Prevalence of specific cardiac disorders.

Condition	Prevalence	Condition	Prevalence
Sinus Node disease	6(4.1%)	Long QT	2(1.4 %)
Hypertrophic Cardiomyopathy	1(0.7%)	Inducible ventricular tachycardia(VT)	3(2%)
Atrioventricular block and bundle branch blocks	6(4.1 %)	Supraventricular tachycardia	1(0.7%)
Myocarditis	1(0.7 %)	Drug induced bradycardia	4(2.7%)
Hypersensitive carotid	2(1.4%)	Severe Mitral Stenosis	1(0.7%)
Rabdomyoma	1(0.7%)	Post Coronary bypass surgery	7(4.8%)
Left Ventricular Hypertrophy	1(0.7%)	Left Ventricular dysfunction	9(6%)
ICD and Pacemaker malfunction	2(1.4%)	Severe Tricuspid Regurgitation	1(0.7)

Table 2. Syncope prevalence according to age groups.

5-14 years:	4.1%
15-44 years:	44.8%
45-64 years:	31%
65 years and older:	20%

Table 3. Frequency of ECG abnormalities

Premature Ventricular Complexes	4(2.7%)	Long QT interval	2(1.4%)
Atrial Fibrillation	4(2.7%)	Non sustained VT	1(0.7%)
Sinus Node Dysfunction(sinus bradycardia or block)	10(6.9%)	Complete Heart Block	1(0.7%)
ST-T Change	2(1.4%)	Left Ventricular Hypertrophy	2(1.4%)
First degree AV block	3(2%)	Transient Junctional Rhythms	2(1.4%)
Bundle Branch Block	6(4.1%)	Short PR interval	1(0.7%)
Left Anterior Hemi-Block	3(2%)	Brugada type ECG	1(0.7%)

Nine patients (6%) had Left Ventricular dysfunction, seven had different degrees of mitral regurgitation and one had severe tricuspid regurgitation. Three patients had positive exercise tolerance test. Holter monitoring revealed frequent premature ventricular complexes in 5 cases, sinus bradycardia in 6, supraventricular tachycardias in 5 and premature atrial complexes in 4 with no concomitant syncope. Electrophysiological studies were done in 7 cases. Ventricular tachycardia was induced in 3 patients, two showed infra-nodal conduction disease and HV interval prolongation and one had AV nodal reentry (AVNRT). At follow up, forty one patients received medical therapy including fludrocortisone and beta blockers. Twelve (8.3%) had a pacemaker and nine (6.2%) had ICDs implanted.

Discussion

Etiology of syncope comprises a wide spectrum of benign to life-threatening conditions. Knowledge of appropriate approach to diagnosis and management is mandatory for all physicians engaged in clinical medical fields. Patients with a high-risk underlying cause, including cardiac and neurologic disorders, should be admitted for further evaluation while those with possible benign conditions can be discharged safely and followed as recommended (7). Although existing etiologic lists are extensive and diverse, common causes could be grouped as following:

- Neurally Mediated syncope (e.g. Vasovagal,Carotid sinus syncope,situational syncope)
- Orthostatic Hypotension(e.g. Autonomic Failure, Drugs, Volume depletion)
- Cardiac Disorders (e.g. Arrhythmias, proarrhythmic drugs, valvular obstructive diseases, Ischemia, Cardiomyopathies, tumors, pulmonary embolism.)
- Cerebrovascular (e.g. Vascular steal syndrome, epilepsy)
- Disorders mimicking syncope (e.g. falls, psychogenic pseudo-syncope) (8).

Through a meticulous history, physical examination, and electrocardiography, the diagnosis might clarify on many instances, obviating the need for further diagnostic testing; as many are costly with a relatively low diagnostic yield (9). Syncope during exertion proceeded by palpitation and those associated with a history of heart failure or coronary artery disease reportedly carry an ominous outcome (10). Also, those with multiple episodes compared with an isolated event are more likely to have a serious underlying disorder (11). Despite extensive investigations, syncope etiology might remain obscure. In one study Up to 40% of syncopes were classified as of idiopathic origin (12). In another study syncope was twice as common in patients with history of structural heart disease. Furthermore, mortality was 30% higher in those with a previous episode of syncope compared to those with no such history. (13)Mortality and recurrences are reported to rise as people grow older, but these studies have generally been conducted in patients who were middle age or old at presentation (15). In our study highest prevalence was in the 15-44 years age group which is compatible with studies conducted in the younger patient populations (16) but different from studies in which affected individuals were only interviewed regarding having a syncopal history at a younger age (8,17). We think these studies might have missed a large group of younger individuals who have had no recurrences at an older age. 42% of syncopal episodes lead to hospital admission with a reported 4.4% mortality of which 1.1% are thought to be cardiac in origin (10). In our study, coronary artery disease had a high relative prevalence (12.4%) which was close to 10.4% reported in one metanalysis (10). Underlying cardiac abnormalities were present in approximately 32.5% of patients. Sinus node diseases were the most common arrhythmic cause of syncope and were responsible for most pacemaker implantations. Left Ventricular dysfunction was also prevalent (6%). Sixty percent of syncopes were neurally mediated. Although vasovagal reactions appear to be the most common known etiology, High prevalence of structural heart diseases in affected individuals warrants careful cardiovascular evaluation based on case to case clinical

judgment. Patients in our study had undergone different diagnostic tests, but etiology remained unknown in at least 15%. The important point that some patients with a positive tilt table test might have a different and serious underlying cause of syncope independent of orthostatic intolerance should be considered as well. In conclusion, efforts to classify syncope etiologies and their pertaining risk helps to better direct diagnostic tests and use of health care resources. To the best of our knowledge there are very few if any comprehensive epidemiologic studies conducted on syncope prevalence and main etiologies in Iran and Middle Eastern region. In our study neurocardiogenic syncope, also known as vasovagal syncope had the highest prevalence between recognized etiologies, which was in accordance with available studies, mainly reported in United States or European nations (25); followed by cardiac causes. Peak prevalence was also noted to be in young and middle age group despite what some other studies found (for the syncope to increase by aging), (25) which might be due to younger mean age of our study population or Iranian community in general.

This study was performed in an outpatient setting and high costs or demanding diagnostic procedures might have limited some patient's compliance and acceptance of specific tests. However importance of following and recording future events even in those with apparently benign features cannot be overemphasized. Long term follow up of some idiopathic cases and use of implantable loop recorders could have established the cause on some occasions. Our study consisted of outpatient population. Etiologies might be different in hospitalized groups (26). Further studies in general hospitals or on a nation-wide basis seem worthwhile.

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