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THE EVALUATION OF 30-DAY MORTALITY AND MORBIDITY IN PATIENTS WHO PRESENT TO THE EMERGENCY DEPARTMENT WITH A SYMPTOM OF SYNCOPE

Acil Servise Senkop Şikâyeti ile Başvuran Hastalarda 30 Günlük Mortalite ve Morbidite Değerlendirilmesi

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ABSTRACT

Introduction: The aim of the present study was to investigate whether there was a significant difference in the development of a severe event during the 30-day follow-up between low-risk and high-risk patients according to the San Francisco Syncope Criteria (SFSC) who visited to our emergency department with symptoms of syncope.

Material and Methods: Patients over the age of 18 years who visited our hospital emergency department between June 2011 and September 2011 with a symptom of syncope were included in the study. The study was conducted prospectively. The patients were divided into 2 groups. Patients with a score of 1 or above on the San Francisco Syncope Criteria were accepted as the high-risk group and others as the low-risk group. The patients were followed up for 30 days after their visit to the emergency department and the severe events that developed within this period were investigated.

Results: We included 91 of the 95 patients who showed symptoms of syncope in the study. The distribution of the patients to the at-risk and no-risk groups was 26.4% and 73.6%, respectively. Follow-up of the at-risk group for 30 days revealed that 75% experienced no problem, 16.7% experienced other problems that were not severe and 8.3% died. In the no-risk group, 76.1% of the patients had no problem during the 30-day follow-up while 23.9% had other problems that were not severe and no one died.

Conclusion: The at-risk group according to San Francisco Syncope Criteria had a higher risk of a severe event developing within 30 days. Patients with high-risk factors should not be discharged and they should be hospitalized so that the etiology can be investigated.

***Keywords**: Emergency, mortality, syncope*

ÖZ

Giriş: Bu çalışmada amacımız acil servisimize (AS) senkop şikâyeti ile başvuran San Francisco Senkop Kriterlerine (SFSK) göre düşük riskli kabul edilen hastaların yüksek riskli kabul edilenlere göre başvurudan itibaren 30 günlük takiplerinde ciddi olay gelişip gelişmediğini ve bu iki grup arasında anlamlı bir fark olup olmadığını araştırmaktır.

Gereç ve Yöntem: Haziran 2011- Eylül 2011 tarihleri arasında hastanemiz acil servisine senkop şikâyeti ile başvuran 18 yaş üstü hastalar çalışmaya dâhil edildi. Çalışma prospektif olarak düzenlendi. Hastalar iki gruba ayrıldı. Birinci grup San Francisco Senkop Kriterlerine uyanlar olup, 1 puan ve üzeri alan hastalar yüksek riskli olarak, ikinci grup ise San Francisco Senkop Kriterlerine uymayan hastalar olup düşük risk grubu olarak değerlendirildi. Hastalar acil servise başvurularından itibaren bir ay süreyle takip edildi ve bu süre içerisinde gelişen ciddi olaylar araştırıldı.

Bulgular: Senkop şikâyeti ile başvuran 95 hastanın 91'i çalışmaya alındı. Yüksek riskli ve düşük riskli hastaların dağılımı %26.4'e %73.6 şeklinde oldu. Riskli gruptaki hastaların 30 günlük ciddi olay gelişimi takip edildiğinde %8.3'nün öldüğü, %75'nin hiçbir sorun yaşamadığı ve %16.7'nin ise ciddi olmayan diğer sorunlar yaşadığı tespit edildi. Risksiz grubun 30 gün takiplerinde ise hiçbir hastanın ölmediği, %23.9'nun ciddi olmayan diğer sorunlar yaşadığı ve %76.1 'nin ise hiçbir sorun yaşamadığı belirlendi.

Sonuç: San Francisco Senkop Kriterine göre riskli grupta olan hastaların 30 günlük süre içinde ciddi olay geçirme ihtimalleri daha yüksektir. Yüksek risk faktörlerine sahip hastaların taburcu edilmeyip, hospitalize edilerek; etiyolojiye yönelik araştırmalar yapılmasının uygun olacağını düşünmekteyiz.

***Anahtar Kelimeler**: Acil, mortalite, senkop*

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INTRODUCTION

Syncope is a complex of symptoms characterized by loss of postural tonus as a result of sudden and transient global cerebral hypoperfusion lasting a short period with spontaneous full recovery (1). The cause is divided into 3 main groups as cardiac, non-cardiac and unknown. The non-cardiac cases are divided into reflex, orthostatic, neurological and psychological types (2). Reflex syncope is the most common syncope type. Although the pathophysiology is now better understood, the diagnostic approach is still difficult and inadequate (3).

Syncope has significant percentage of the reasons to visit an emergency department (ED). It is directly responsible for 1-3% of all ED presentations and 2-6% of hospitalizations (3). Most of the patients who visit the ED with a history of syncope are usually asymptomatic at admission. The syncope incidence is higher in the elderly patients due to comorbid disorders, concurrent drug use, cognitive disorders, and age-related physiological changes. Syncope is seen more commonly at an advanced age (2). The hospitalization of patients over the age of sixty who visit the emergency department with symptoms of syncope is important as the mortality and morbidity of cardiac syncope is higher in this group (3).

Patients presenting with symptoms of syncope are divided into two groups as having high and low risk using risk-scoring systems (4). It is possible to predict the clinical outcome after up to two years using these scoring systems in patients who present with syncope.

The aim of the present study was to investigate whether there was a significant difference in the development of a severe event during the 30-day follow-up between low-risk and high-risk patients according to the San Francisco Syncope Criteria (SFSC) who visited to our emergency department with symptoms of syncope.

MATERIALS AND METHODS

Patients over the age of 18 who visited our ED between June 2011 and September 2011 were included in the study randomly. The study was conducted prospectively and the consent of the ethics committee of our hospital was obtained (Ethics committee no: 0422; Date: 15.06.2011). Patients included in the study or their relatives signed an informed consent form after discussion with the physician examining the patient.

The patients were divided into 2 groups. The first group included patients who had received a score of 1 or above from the SFSC and were accepted to have high risk (Table 1).

Table 1. San Francisco Syncope Criteria

Criterion	***Score***
Shortness of breath	1
Hypotension during triage (systolic BP <90 mm Hg)	1
Abnormal ECG	1
Anemia; hematocrit < 30%	1
CHF	1

The second group included patients without any of the SFSC and who were accepted to have low risk (2, 4). After the patients were evaluated, the following were excluded from the study: patients who described syncope secondary to alcohol ingestion, head trauma, or drug intoxication; epileptic seizures; patients not fully describing syncope; patients with conversion reactions, those who had gained consciousness pharmacological and/or electrical intervention at presentation and patients who were thought to be suffering from cataplexy.

The patients were called by phone 1 month after presentation to the ED and any severe event (death, myocardial infarction, arrhythmia, pulmonary embolism, stroke, intracranial hemorrhage, aortic

dissection, significant gastrointestinal bleeding, anemia requiring transfusion, presenting at the ED again with syncope and related hospitalization) developing within this period was investigated.

Complete blood count electrolytes, venous blood gas, blood glucose, cardiac enzymes, urea, creatinine, and Human chorionic gonadotropin (HCG) (for females of childbearing age) values were investigated. Cranial computed tomography (CT) and/or abdominal ultrasonography (USG) were performed according to the clinical signs and the preliminary diagnosis.

The name, the surname and the gender of the patients, and the time of the symptoms show, the signs before fainting, the additional disorders, the history, physical examination findings, the laboratory results and the adverse events developing within a month were recorded on the form we developed.

Data analyses were performed with the SPSS 18.0 software program. Pearson chi-square and Fisher's exact test were used for the analysis of categorical variables, and the Mann-Whitney U test was used for the analysis of constant variables. P values smaller than 0.05 were accepted as statistically significant.

RESULTS

A total of 95 patients who presented within the 4 months to our ED with a symptom of syncope were included in the evaluation. Four patients were excluded (1 had drug intoxication, 2 were secondary to trauma and 1 person had a pseudosyncope) and the study was conducted with 91 patients.

Duration of presentation to ED after syncope was within the first hour in 62 (68.1%) patients, 1 to 3 hours in 17 (18.7%) and 3 to 5 hours in 12 (13.2%).

The symptoms of the patients before the syncope is presented in Table 2.

Demographical features of patients and their comorbid diseases are presented in Table 3.

The mean age was 52.83 ± 17.28 years (n=24) for the high-risk patients and 40.76±16.86 years (n=67) for the low-risk patients according to the SFSC (SFSC is presented in Table 3).

A statistically significant difference was present between the age of the high-risk and low-risk patients. The mean age was higher in the patients with high risk (p=0.006).

Table 2. The Symptoms of the Patients before the Syncope

Symptoms Before the Syncope	**n (%)**
Dizziness	18 (19.8%)
Sweating, dizziness, eye blackening	17 (18.7%)
Blackout	12 (13.2%)
Headache	6 (6.6%)
Micturition	6 (6.6%)
Abdominal pain	3 (3.3%)
Sweating	1 (1.1%)
Palpitation	1 (1.1%)
Sudden position change	1 (1.1%)
Other	26 (28.6%)

Two (2.2%) of the high-risk patients experienced a severe event within 30 days and it was death. The age of the 69 patients without a problem was 69.5±0.71 years and the age of the 20 patients with other problems not considered severe was 44.55±21.42 years. There was no significant difference between the ages of the patients without a problem and patients with other problems not considered severe on within 30 days (all symptoms other than the disorders or symptoms we had identified as severe events were named “other problems”) (p=0.953). The patients who had died were lost during their hospitalization. No relationship was found between the gender of the

patients and the presence of a severe event within 30 days (p=0.497).

Facial asymmetry was found in 1 (1.1%) patient and sensory motor deficiency in the extremities in 1 (1.1%) patient. Cerebellar skill examination results were normal in 89 (97.8%) patients. No relationship was found between the stated variables and the presence of a severe event within 30 days.

The heart rate was normal on ECG in 82 (90.1%) patients, bradycardic in 4 (4.4%) patients and tachycardic in 5 (5.5%) patients. The ECG showed sinus rhythm in 85 (93.4%) patients and atrial fibrillation (AF) in 6 (6.6%) patients. There was no ECG pathology in 74 (81.3%) patients, ST-T changes in 16 (17.6%) patients and QT prolongation in 1 (1.1%) patient.

We evaluated whether the ECG findings at visit was associated with a severe event within 30 days. Of the patients with normal heart rate, 61 (74.4%) had no problem while 1 (1.2%) patient died and 20 (24.4%) patients experienced other problems. No severe event occurred within 30 days in any of the bradycardic patients. There was also no problem in 4 (80%) of the tachycardic patients but 1 (20%) patient died. Of the 85 patients with normal rhythm on ECG, 65 (76.5%) experienced no problem, 1 (1.2%) died and 19 (22.4%) experienced other problems within 30 days. In the 6 patients with atrial fibrillation (AF), 4 (66.7%) had no problem, 1 (16.7%) died and 1 (16.7%) experienced other problems. No problem occurred within 30 days in 1 patient with QT prolongation. Of the 16 patients with ST-T changes, 2 (12.5%) died within 30 days, 11 (68.8%) had no problem and 3 (18.8%) experienced other problems. The rates, risk scores and score rates of the patients consistent with SFSC and whether these were related to the severe event development rate at 30 days were investigated. Anemia was found in 2 (2.2%) subjects and not found in 89 (97.8%) subjects at visit. One (50%) of the two patients with anemia experienced other problems that were not severe within 30 days and 1 (50%) had no problem. Congestive heart failure (CHF) signs were present in only 1 (1.1%) patient at the ED and not seen in 90 (98.9%) patients. An abnormal ECG was found in 19 (20.9%) patients while the ECG was normal in 72 (79.1%) patients. Two (2.2%) patients were found to have shortness of breath while 89 (97.8%) not.

Patients who had at least one SFSC were included in the at-risk group. Evaluation of the severe events that developed within the 30-day follow-up revealed that 1 patient with CHF died; 2 patients with an abnormal ECG (10.5%) died; 3 (15.8%) patients experienced other problems; 14 (73.7%) patients had no problems; and 2 patients with shortness of breath died (Table 4).

There were 24 (26.4%) patients in the at-risk group and 67 (73.6%) in the no-risk group. Analysis of severe event development within 30 days in the at-risk group revealed death in 2 (8.3%) patients, no problem in 18 (75%) patients and other non-severe problems in 4 (6.7%) patients. No one died in the no-risk group, 16 (23.9%) patients had other problems that were not severe and 51 (76.1%) patients experienced no problem in the 30-day follow-up (Table 5).

In one of the two events that death occurred, there were three risk factors although the other one had four (Table 5). The presence of high-risk factors increased the possibility of developing severe events within 30 days.

Of the 91 syncope patients we included in the study, 5 (4.3%) were diagnosed with cardiogenic syncope and 86 (95.7%) with non-cardiogenic syncope. The relationship between the syncope diagnosis and the rates of severe events in these patients encountered within the 30-day follow-up is presented below (Table 4).

Eighty-two (90.1%) patients were discharged from our ED, 5 (5.5%) were hospitalized after the first evaluation and 4 (4.4%) were referred to another health center. Sixty-four (78%) of the patients who were

discharged after follow-up at the ED experienced no problem during the 30-day follow-up while 18 (22%) encountered other problems that were not severe. One (20%) of the hospitalized patients died within 30 days, 2 (40%) had no problems and the remaining 2 patients encountered other problems that were not severe. One (25%) of the patients referred to another health center died within 30 days and 3 (75%) experienced no problems.

There were 4 (4.4%) patients with a recurrent syncope attack during the 30-day follow-up. Two (50%) of these patients died within 30 days and 2 (50%) experienced another non-severe problem**.**

Table 3. Demographical features of patients, their comorbid diseases, habits and blood pressure

		***n* (%)**	**BP (mmHg)**	***n* (%)**
Age		*43.94±17.71*	NBP	83 (91.2)
			Sistolik <90	6 (6.6)
			Sistolik>140	2 (2.2)
Sex	*M/F*	43 (47.3)/48 (52.7)		
Comorbid Conditions	*DM*	7 (7.7)		
	HT	5 (5.5)		
	DM+HT	5 (5.5)		
	HT+CAD	4 (4.4)		
	PD	3 (3.3)		
	CVD	2 (2.2)		
	CAD	1 (1.1)		
	DM+CAD	1 (1.1)		
	DM+CVD	1 (1.1)		
No Additional Disease		62 (68.1)		
Habits	*Alcohol*	2 (2.2)		
	Smoking	27 (29.7)		

M/F: Male/Female, **DM**: Diabetes Mellitus, **HT**: Hipertansiyon, **CAD**: Coronary Artery Disease, **PD**: Psychiatric Disease,
CVD: Cerebrovascular Disease **BP**: Blood Pressure, **NBP**: Normale Blood Pressure

Table 4. Relationship between CHF, ECG and shortness of breath, syncope diagnosis and the development of a severe event within 30 days

Severe event within thirty days	**Other** ***n* (%)**	**Death** ***n* (%)**	**None** ***n* (%)**	**Total** ***n* (%)**
CHF (+)	0 (0%)	1 (100%)	0 (0%)	1 (1.1%)
CHF (-)	20 (22.2%)	1 (1.1%)	69 (76.7%)	90 (98.9%)
Abnormal ECG (+)	3 (15.8%)	2 (10.5%)	14 (73.7%)	19 (20.9%)
Abnormal ECG (-)	17 (23.6%)	0 (0%)	55 (76.4%)	72 (79.1%)
Shortness of breath (+)	0 (0%)	2 (100%)	0 (0%)	2 (2.2%)
Shortness of breath (-)	20 (22.5%)	0 (0%)	69 (77.5%)	89 (97.8%)
Cardiogenic	0 (0%)	2 (40%)	3 (60%)	5 (4.3%)
Non-cardiogenic	20 (23.3%)	0 (0%)	66 (76.7%)	86 (95.7%)

CHF: Congenital Heart Failure**; ECG**: Electrocardiography

Table 5. Relationship between syncope diagnosis and severe event development within 30 days

Severe event within thirty days	**Other**	**Death**	**None**	**Total**
Risk	***n* (%)**	***n* (%)**	***n* (%)**	***n* (%)**
None	16 (23.9%)	0 (0%)	51 (76.1%)	67 (73.6%)
One risk	4 (25%)	0 (0%)	12 (75%)	16 (17.6%)
Two risks	0 (0%)	0 (0%)	6 (100%)	6 (6.6%)
Three risks	0 (0%)	**1 (100%)**	0 (0%)	1 (1.1%)
Four risks	0 (0%)	**1 (100%)**	0 (0%)	1 (1.1%)

DISCUSSION

Syncope is responsible for 1-3% of all emergency department (ED) visits and 2-6% of hospitalizations (3). Some countries have syncope units within the ED where those patients are evaluated with a multidisciplinary approach. Some risk scoring systems have been established in order to determine the patients at risk quickly in the ED as the disorder can cause severe morbidity and mortality. Investigating the ED follow-up duration, hospitalization and etiology of patients with high scores has been planned. However, there are currently no syncope units with such purpose and equipment in our country. The lifetime syncope prevalence is approximately 50% according to Shen et al (5). The etiology can range from an extremely benign condition to many life-threatening disorders. A detailed history, physical examination, diagnostic tests and their interpretation are important in the evaluation of the patients presenting with a symptom of syncope. It is therefore possible to differentiate real syncope from other symptoms. It is important to properly evaluate syncope in the ED as it may be a precursor to recurrent attacks and life-threatening disorders.

The mean age of the patients who presented to the ED with a symptom of syncope was 61 years in the Quinn et al. study (6), 57±23 years in the Esquivias et al. study (7) and 43.94±17.71 (minimum 18, maximum 86) years in our study. The mean age of the patients who visited our ED complaining of syncope was lower than in similar studies. The incidence of severe event development was lower for patients presenting at a younger age. A statistically significant difference was seen between the ages of patients with and without risk according to the SFSC. The age of the at-risk patients was higher (p=0.006). No significant difference was found between the age of the patients with and without a problem after the 30-day follow-up (p=0.953). The reason for the lack of a difference could be the low number of the subjects and the development of a severe event only in two patients within 30 days.

We found that 68% of the patients had visit ED within 1 hour of the syncope event. This indicates that the patients took the event seriously and visit ED as quickly as possible. No statistically significant relationship found between the duration of presentation to ED and the rate of severe event development during the 30-day follow-up (p=0.178).

Esquivias et al. found that 42% of their patients had dizziness + sweating, 17% had palpitation, 16% had chest pain, 10% had dyspnea and 16% had other prodromal symptoms before the syncope (7). The most common symptoms in our study were dizziness

(19.8%); sweating, blackout and dizziness together (18.7%), and blackout alone (13.2%). Dizziness, sweating and blackout were the most common symptoms before syncope. These symptoms provide an indication of syncope etiology.

A history of a syncope attack was present in 19% of our patients. Death occurred in 50% (2 patients) of the patients who had recurrent syncope attacks during the 30-day follow-up. Rodríguez-Entem reported that 12 (6%) of their 199 patients had recurrent syncope attacks during their 237-day follow-up and 3 of the patients died during this period (8). A syncope attack recurring within a short time could be associated with mortality. Rodríguez-Entem reported a higher mortality rate for patients with recurrent syncope attacks, similar to our study. A much larger number of patients is required to be able to generalize our results. The relationship between mortality and repeating syncope attacks can be investigated with studies on a larger number of subjects.

Systolic BP <90 mmHg was found as risk factor according to the SFSC in 6 (6.6%) of the patients in the ED evaluation in our study. Benjamin C et al. found a systolic BP <90 mmHg at visit in 5% of their 477 patients (9). Sun et al found hypotension at presentation in 2% of their 2871 patients and in 3% of the 173 patients who experienced a severe event within 30 days (10). A systolic BP <90 mmHg was found in one of the patients who had a severe event within 30 days in our study.

The hematocrit value was <30% in 5% of all patients and also in 5% of the patients who developed a severe event during the 30-day follow-up in the Sun et al. study (10). Benjamin et al. reported a hematocrit <30% was present in 6% of their 477 patients and 15% of the 56 patients who developed a severe event within 7 days (9). There was no anemia in the patients who died within 30 days and we found no effect of anemia on the development of severe events in our study.

After being diagnosed with syncope at ED, 5 of our patients (5.5%) were hospitalized and 4 (4.4%) were referred to another health center. A patient who was hospitalized and a patient who was transferred died during the hospitalization period. Rodríguez-Entem et al. reported a hospitalization rate of 10%, similar to our study (8). Sun et al. reported that 26 of 2871 patients were hospitalized after being evaluated in the emergency department and a severe event did not develop in any of these patients during the hospitalization (10). The fact that a severe event developed in only two of our patients and that these two patients were hospitalized shows that we evaluated the risk criteria in these patients correctly. Hospitalizing patients with high-risk criteria and investigating the etiology will decrease the mortality and morbidity rates of the patients.

Baron- Esquivias reported that 346 (28%) of their 1217 patients were diagnosed with syncope with unknown reasons, 141 (11.5%) with cardiogenic syncope and the remaining with non-cardiogenic syncope (7). We similarly diagnosed non-cardiogenic syncope in 96% of our patients.

A severe event developed in 11 of 99 patients (within 7 days in 8 and within 3 months in 3) in the study by Reed et al. (11). Of these patients, 5 died while 6 developed other severe events. We had 2 patients (2.2%) with a severe event (death) within 30 days (one patient died about 24 hours later and the other 10 days later at the hospital). Sun et al. found a severe event within 7 days in 56 (11.7%) of a total of 477 patients. Age, gender and race were found to make no difference in this study. The incidence of serious event development within a short time was higher in their study than ours (12). We believe that the reason could be the lower number of patients and the lower mean age of our group. Similar to our study, 41 (1%) of the 2,871 patients died outside the emergency department within 1 month in study by Sun et al. (10) and a severe event developed within 30 days in 54 (6.8%) of a total

of 791 patients in a study by Quinn et al (6). Three patients died, 23 developed arrhythmia, 11 myocardial infarction, 3 sepsis, 3 patients and 1 patient another severe event such as valvular heart disease. The figures above show how syncope can be very serious and resulted in death, requiring a serious approach in ED.

Reed evaluated 99 patients and classified 32 as high risk, 51 as moderate risk and 16 as low risk (11). Of the 11 patients who developed a severe event, 7 were evaluated as high risk and 4 as moderate risk. Birnbaum reported that 323 (45%) of their 713 patients included in their study on SFSC were in the at-risk group and a severe event developed in 45 (13). Three hundred and ninety (55%) patients were evaluated as no risk according to the SFSC and a severe event was observed in 16 of these patients. Sensitivity and specifity of the SFSC was calculated as 74% and 57% in this study, respectively. Sun et al. found that the SFSC was to be 100% sensitive to determine the development of severe events with risk factor (14). Kapoor and Eagle reported the 1-year mortality rate as 4-6% for syncope patients while the rate was 30% for high-risk patients (15,16). There were 24 (26.4%) patients in the at-risk group and 67 (73.6%) patients in the no-risk group according to the SFSC in our study. Analysis of severe event development within 30 days in the at-risk group revealed death in 2 (8.3%), no problem in 18 (75%) and non-severe other problems in 4 (6.7%). None of the no-risk group patients died; 16 (23.9%) had non-severe problems while 51 (76.1%) experienced no problems during the 30-day follow-up. In conclusion, the possibility of experiencing a severe event within 30 days was higher in the at-risk group. We detected the presence of three (shortness of breath, abnormal electrocardiography (ECG), BP during triage <90 mmHg) and four (shortness of breath, abnormal ECG, CHF, anemia) risk factors in the two patients who died. The presence of high-risk factors increased the possibility of developing severe events within 30 days. However, there was similarly no severe event within 30 days in patients with low-risk factors. The history, physical examination, and ECG of patients who visit ED with a symptom of syncope have an important role in the diagnosis of the condition and elucidation of the etiology. Risk evaluations should be performed for the patients according to the SFSC and the patients at high risk should not be discharged so that the etiology can be investigated due to the higher possibility of severe events developing within 30 days.

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